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ABSTRACT

The Anik-B Project is part of the two-year communications experiments for which the Anik-B satellite is being used. The project was designed to explore the possibilities of using Interactive Instructional Television (IITV) to provide distance postsecondary education for people living in widely scattered and sometimes inaccessible areas of British Columbia. The project proved to be both educationally feasible and acceptable to the people. This Technical Report, the second of six reports stemming from the project, traces the history of the development of the technical system and its operations at the British Columbia Institute of Technology (BCIT) and at the receiving colleges. It describes each component in the following order: the originating classroom at BCIT; the classrooms at the receiving colleges; the video system; the audio system; the 12-14 GHz system aboard the Anik-B satellite; and the transmitting and receiving terminals made available by the Department of Communications, Canada, and the equipment in the receiving college classrooms. (KC)

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ANIK-B INTERACTIVE INSTRUCTIONAL TELEVISION PROJECT

OCTOBER 1, 1979 - MAY 31, 1980

REPORT NUMBER TWO

THE TECHNICAL SYSTEM AND ITS OPERATION

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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W.D. Robertson

Date: October 1980

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PROJECT REPORTS

The Anik-B IITV project is reported in a series of six reports numbered and titled as follows:

		COST
1.	Project Overview	$ 3.00
2.	The Technical System and Its Operation	$ 4.00
3.	Programme Description	$ 6.00
4.	Evaluation Perspectives	$10.00
5.	Financial Analysis	$ 3.00
6.	Administrative Structures and Procedures	$ 3.00

As the titles suggest, each report covers a different aspect of the project and each is separately bound. They are available from:

British Columbia Institute of Technology
Distance Education Department
3700 Willingdon Avenue
Burnaby, B.C., Canada
V5G 3H2

List Of Abbreviations

ACCESS	Alberta Educational Communications Corporation
BCIT	British Columbia Institute of Technology
B.C. TEL	British Columbia Telephone Company
CRC	Communications Research Centre
CCU	Camera Control Unit
DOC	Department of Communications, Canada
DSC	Directed Study Centre
GHz	GigaHertz
IITV	Interactive Instructional Television
LCETs	Low Cost Earth Terminal
Ministry of Education	Ministry of Education, Science and Technology
PEMC	Provincial Education Media Centre
SITN	Stanford Instructional Television Network
TVRT	Television receive with telephony transmit/receive
TVT	Television Transmitting Trailer
VTR	Video Tape Recorder (record and playback)

SUMMARY

This project used the Canadian communications satellite, Anik-B, to send live video and audio signals from a specially designed 24-seat classroom at the British Columbia Institute of Technology (BCIT) to students at 11 receiving centres (10 in British Columbia and Whitehorse in Yukon). Students at these centres and at BCIT were able to talk to one another and to the instructor by using the telephones located on their desks. The telephone signals from six of the centres were beamed off the satellite, while the other five centres used regular long-distance telephone lines. The system was designed so that everyone, no matter where they were located, could hear and contribute to the interaction and ask questions of the instructor.

In the originating classroom at BCIT, three colour cameras equipped with zoom lenses were suspended from the ceiling. In addition, a mobile camera was mounted on a tripod to provide greater flexibility. Another camera with a remotely controlled zoom and focus lens was mounted above the instructor's desk. This camera shot illustrations and other materials and functioned in the manner of an overhead projector in a normal classroom. A sixth camera was located in the control room to shoot identification graphics. Several colour monitors were set up for the students and the instructor.

Next to the originating classroom was another classroom equipped with monitors and telephones. It was used both as the control room and as an overflow area for additional students. For the heart of the control room system, professional quality synchronizing pulse generators and video processing equipment were chosen. However, because the capital budget was limited, industrial quality cameras and camera monitors, simple video switchers and basic video cassette record and playback machines comprised the remainder of the equipment. To maintain standard quality, a broadcast quality colour monitor, a waveform monitor and a vector scope were also used. The audio system included two five-input

mixers, lavalier and wireless microphones, an audio cassette player, the interactive telephone system and a limiting amplifier which fed the satellite transmitter. The control room system was designed to keep the one-person operation as simple as possible. A three metre antenna was used to broadcast the video, audio and separate telephone signals to one of the 12/14 GHz channels on the satellite. Three metre, 1.8 metre, and 1.2 metre antennas were used at the receiving centres.

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INTRODUCTION

The Interactive Instructional Television (IITV) project used the Canadian communications satellite, Anik-B, to provide a two-way educational communications network to ten centres in British Columbia and to one in Whitehorse in Yukon. Between October 1 1979 and May 31 1980 the Canadian Department of Communications provided satellite time and equipment to permit the British Columbia Ministry of Education, Science and Technology[1] and members of the post-secondary education community in the province to experiment with the delivery of education via interactive television. Alberta joined the second half of the project in March 1980. The experiment was designed to explore the possibilities of distance education for people living in widely scattered and sometimes inaccessible areas of British Columbia and to determine whether interactive instructional television would be both feasible and acceptable to the people it was designed to serve. If it were, then it would be an excellent means of making many post-secondary educational opportunities as available to rural communities as they are to communities in the urban areas.

The project was constructed on a consortium model with all of the receiving institutions as well as the sending institutions participating in the selection of courses and in the project decision-making. Courses were selected to complement those offered through local colleges or to provide training for specialized groups such as employees of the Ministry of Highways, lawyers, doctors and building inspectors.

Delivery of education by this method was found to be effective and well received by most persons participating at the receiving sites.

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[1] This Ministry will subsequently be referred to as the Ministry of Education.

At the British Columbia Institute of Technology a specially designed classroom equipped with colour television cameras transmitted information, via the satellite to eleven distant classrooms. A maximum of twenty-four students in the originating classroom could watch the instructor in person and on television sets. They were able to talk to the other students in the remote locations via telephones located on the students' desks. The remote students could see the instructor on their television sets but the instructor could not see them. The classrooms at each remote site, and an additional overflow classroom at BCIT also contained television sets and telephones for up to twenty students, so the remote students could interact and ask questions of the instructor at BCIT. The system was designed so that everyone, no matter where they were located, could hear and contribute to the interaction. While most of the programming was live, it was also possible to play back complete videotaped programmes and add pre-taped segments to live programmes.

Six of the receiving sites could not only receive television from BCIT but could also transmit telephony via the satellite, back to BCIT. These were located at Cranbrook, Dawson Creek, Port Alberni, Prince George, and Terrace in British Columbia, and Whitehorse in Yukon. Five additional receiving sites could interact with BCIT via regular, long-distance telephone lines. These five sites received their satellite signals via receive-only ground terminals: low cost earth terminals (LCETs). These were located at Fort Nelson, Fort St. John, Gold River, Mackenzie, and Prince Rupert in British Columbia.

These two types of ground terminals as well as the television transmitting ground terminal at BCIT were owned, installed and maintained by the federal Department of Communications, who placed them on loan to the project. The provincial Ministry of Education and the participating institutions shared in equipping the sites, and the project was coordinated and managed by extension staff at BCIT.

Four courses which started in September 1979 were videotaped, duplicated and sent to each site enrolling students. When satellite transmission became available on October 1, 1979, these courses and other programmes were broadcast live with interaction. Each programme was taped so that a copy could be sent to receiving sites if technical failure caused students to miss a class. These copies were returned to BCIT and both the copies and master tapes were erased unless the originating instructor or agency wished the master tape to be retained. In addition to this a selection of the master tapes was kept for the archives.

Weekly teleconferences were held by BCIT and the receiving sites during which operational, administrative and some technical problems were discussed and changes suggested.

The project showed that IITV could become an excellent means of distance education for widely dispersed students who would otherwise be denied the educational opportunities available to people in the highly populated areas where educational opportunitites abound.

This report will trace the history of the development of the technical system and its operations at the British Columbia Institute of Technology (BCIT) and at the receiving colleges. It will describe each component in the following order: the originating classrooms at BCIT; the classrooms at the receiving colleges; the video system; the audio system; the 12-14 GHz system aboard the Anik-B satellite, and the transmitting and receiving terminals made available by the Department of Communications, Canada and the equipment in the receiving college classrooms.

DEVELOPMENTAL HISTORY

The first meeting of the Interactive Instructional Television (IITV) Task Force, under the chairmanship of David M. Brousson, Dean of Continuing Education and Industry Services, (C.E. & I.S.) was held on March 1, 1979. At that time, Dean Brousson struck a committee which was to be responsible for the technical and physical facilities. The members named were Lundy Sanderson, Department Head of the Broadcast Communications Department, BCIT, Robert Nason faculty member of the same Department, Trudy Handel, staff member of the Audio Visual Services Department, BCIT, and William Robertson, Head of Distance Education at BCIT.

By March 10, 1979 the committee had held several extensive meetings and decided to adopt a modification of the SITN[1] model of Stanford University for the layout of the teaching classrooms. This model dictated the use of three fixed cameras, one shooting the instructor, the second shooting a chalk board and the third placed overhead shooting down onto the desk in front of the instructor. Students would respond to the instructor by using interactive telephone circuits which at that time were still to be designed.

The capital cost per teaching classroom was set at $60,000 each for a total capital cost of $120,000. It was agreed at the March 10th meeting that the selection of the colour television equipment for the classrooms be made immediately because of protracted delivery times. Dates and details of successive meetings and operational landmarks during the project follow.

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[1] SITN - Stanford Instructional Television Network located at Stanford University, Palo Alto, California.

March 26, 1979

Two regular classrooms located at BCIT were dedicated to the IITV project. These classrooms are back to back and it was considered that they would work well together with one control room constructed against the common wall and facing into both teaching areas: See Figures 1 and 2 on pages 11 and 12.

March 30, 1979

In addition to the members of the Task Force, there were representatives of the Canadian Department of Communications (DOC), Ottawa, and the Ministry of Education Science and Technology of the Province of British Columbia. At this time the project facilities as organized to that date were displayed to the staff from DOC, and the Ministry of Education. There was agreement that the designs be adopted and the equipment so specified be purchased.

April 9, 1979

The estimated costs for renovations to the designated Interactive Instructional Television (IITV) rooms were determined and working drawings were produced. The project coordinator, Brousson, and project manager, Robertson,approved the working drawings and the budget, and the renovations began.

April 25, 1979

Sanderson and Nason reported that they had visited the British Columbia Telephone Company (B.C. Tel) and had begun negotiations with them for the use of telephones as the means of interaction between the teaching classrooms and the receiving classrooms. B.C. Tel suggested the use of a 4-wire telephone communication system which would eliminate audio feedback. Project management accepted this recommendation and directed the Technical Committee to complete negotiations with B.C. Tel as soon as possible.

May 2, 1979

The Technical Committee was instructed to start immediately on the physical changes required for conversion of the two classrooms to two IITV classrooms along with a control room.

May 14, 1979

The Technical Committee was instructed to ensure that B.C. Tel representatives be available for a special meeting on May 17 with representatives from DOC, Ottawa. Handel and Nason reported on their trip to Stanford University at Palo Alto, California where they had viewed the Stanford Instructional Television Network System (SITN). As a result of their report, it was agreed that two senior staff of SITN, Ken Down and Roger Ferner, be invited to come to BCIT during the summer to assist with any design problems during the equipping of the instructional control room and classrooms.

May 17, 1979

In addition to the Task Force, George Davies, Terry Kerr, John Day, Ken Gustafson and Doris Jelly from DOC, Ottawa also attended. During this meeting, all the administrative procedures and operational aspects of the IITV project were discussed thoroughly. At the conclusion of this meeting all of the objectives in the BCIT proposal to DOC were adopted.

May 23, 1979

Nason was named co-ordinator for technical facilities for the IITV project. His report on May 23 stated that the bulk of the video equipment would be arriving at BCIT no later than May 25. B.C. Tel had been sent a letter confirming all of the technical details for installation of the audio interactive circuits and requesting a cost estimate within two weeks.

June 17, 1979

Nason reported that contracts had been secured with B.C. Tel and Broadcast Technical Services for the installation of the video system. The projected target date for complete installation of video and audio equipment was August 15, 1979. This allowed for two weeks for instructor training prior to the commencement of classes in the first week of September.

October 1, 1979

This was the first day of official transmission using the Anik-B satellite.

January 2, 1980

Nason joined the IITV project full-time as Co-ordinator of Technical Services and Operations. This move was predicated by the increase from 18 to 42 hours a week on Anik-B. His responsibility was to recommend and co-ordinate full-time operations employees to be engaged in the project. Until Christmas 1979 the 18 hours of live broadcasting could be staffed by part-time student employees from the BCIT Broadcast Communications Department. However, an increased schedule to 42 hours, commencing in January 1980, created considerable timetable conflicts between satellite operating hours and student in-class hours. This conflict made the employment of full-time students as part-time employees impossible. In addition, technical improvements to the system were being made regularly and full-time co-ordination became mandatory.

January 22, 1980

David Billman and Deanna Giles were secured as full-time employees for the Anik-B IITV project and were classified as technical producers; Billman and Giles were second year students in the television option of the Broadcast Communications Department at BCIT. They were secured under the standing co-operative education plan by which the Institute is able to place in industry, students who are in their fourth term. In this plan, students are able to work as full-time employees and, by completing a learning contract requiring several written reports, are able to begin work prior to graduation. On completion of the learning contract they receive a Diploma of Technology.

DESCRIPTION OF THE BCIT CLASSROOMS

The two classrooms, A and B, assigned for use in the IITV project are 20 feet by 36 feet with a ceiling height of 12 feet. The classrooms served two purposes: as a teaching area for the on-camera instructor and as accommodation for a class to sit in attendance. Tables were arranged in arc shapes behind which the students sat, 5 or 6 to each arc, with one colour television set placed in front. Each arc also had two satellite interactive telephones. These were used by the students when asking questions of the instructor so that students in the distant locations could also hear the questions being asked. This also allowed students at BCIT to interact directly with any student in the IITV system.

Each classroom was originally planned to accommodate 24 students. The seating arrangement in classroom A proved to be the more comfortable for the students because the floor space in classroom B had to be reduced by 128 square feet to provide room for the control platform. As a result, classroom B, rather than being a teaching classroom, was used as an overflow viewing classroom for 16 students. This change in the status of classroom B allowed the three cameras assigned to it to be removed for use in classroom A and the control area.

These became cameras four, five and six which were used as follows:

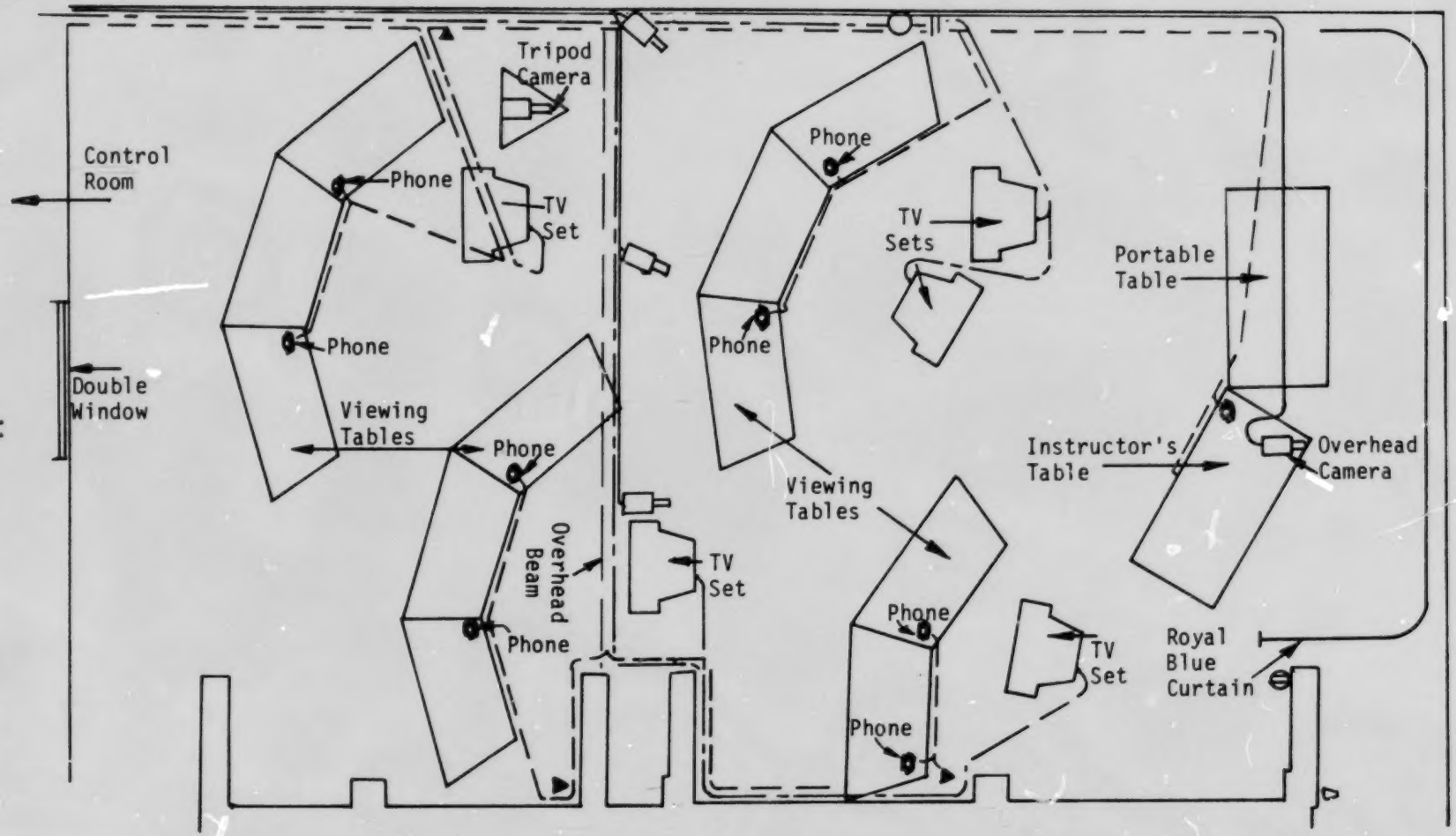
1. camera four was suspended from the ceiling in classroom A to give a comfortable medium shot of a second instructor in team teaching sessions;
2. camera five was installed in classroom A on a wheeled tripod to allow single and group shots of panels of six to eight persons for teleconferences;
3. camera six was located in the control platform area to shoot identification graphics for the IITV system.

Although the chalkboard in classroom A was little used during the first term a proper backdrop was not constructed behind the instructors' area. Beginning in Term 2, it was decided to install a curtain as a backdrop. A ceiling to floor royal blue curtain was installed to run across the entire width of classroom A around the corners and out into the classroom six feet on each side. The curtain allowed for a wide shot of the front of classroom A, and served as a backdrop for panels of six to eight persons. A two section desk was installed in the instruction area with masking pieces which covered one or both tables.

The overhead camera mounted above the instructors' desk in classroom A originally had a manually adjustable zoom lens. After a series of field trials, a Fujinon 10:1 TV zoom lens, Model C5X20MD-3B, was installed on May 16, 1980. This lens operated well and greatly facilitated the use of printed material.

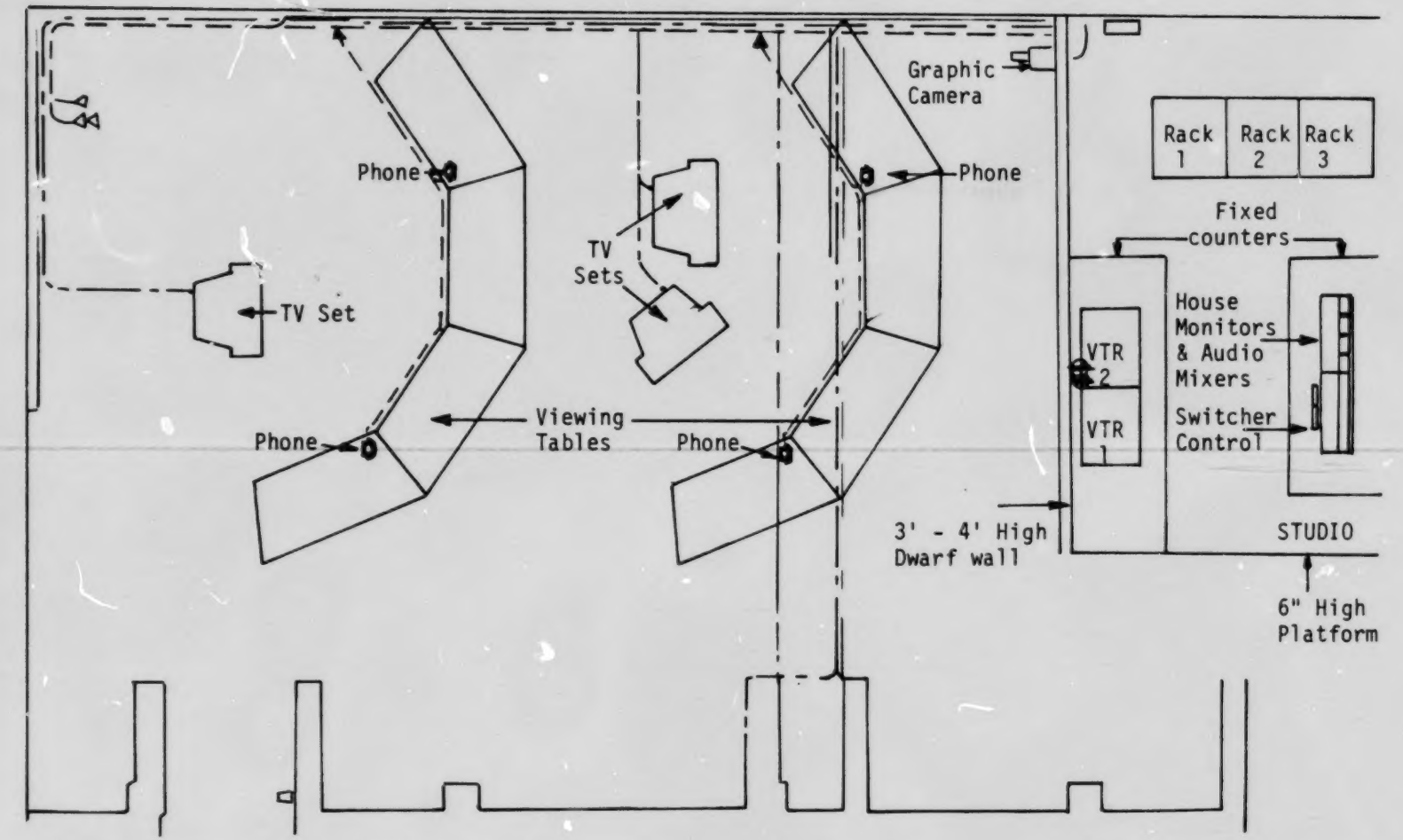
In addition to the seating in classroom A and the viewing classroom B, large groups of students could view and interact with the instructor by using a lecture theatre located across the corridor from classrooms A and B. As many as 170 people can be comfortably seated in this theatre. Two television sets were wheeled into the theatre from classroom B and an interactive telephone was temporarily installed to allow students to ask questions of the instructor in classroom A. Questions from all these locations were heard by all the students in the IITV system.

FIGURE 1: FLOOR PLAN - STUDIO/CLASSROOM



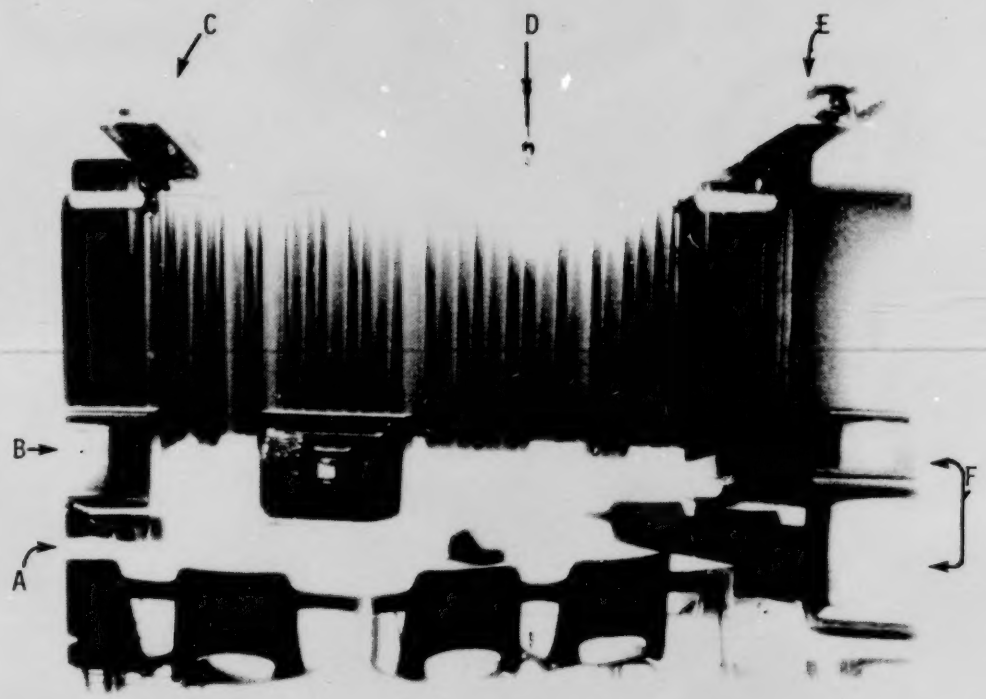
Source: Bing, Richard. BCIT Physical Resourses

FIGURE 2: OVERFLOW CLASSROOM/CONTROL ROOM



Source: Bing, Richard. BCIT Physical Resources

FIGURE 3: CLASSROOM A



A. Arc Shaped Table For Students

B. Student TV Set

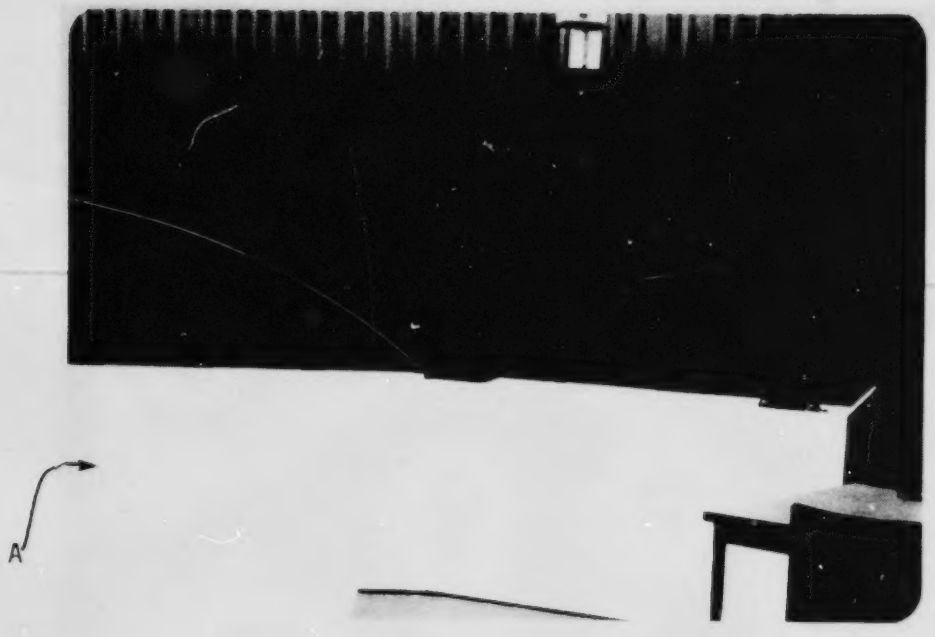
C. Camera (Centre Shot)

D. Camera (Top Shot) Remote Control Zoom Lens

E. Camera (Left Shot)

F. TV Set[illegible] For Students

FIGURE 4: CLASSROOM A
INSTRUCTORS' AREA SET UP FOR A TELECONFERENCE PANEL



A. Removable Desk Panel

FIGURE 5: CLASSROOM A
INSTRUCTORS' AREA

A. JVC Camera with Fujinon Remote Control Zoom Lens

B. Blue Curtain

C. Instructors' Desk

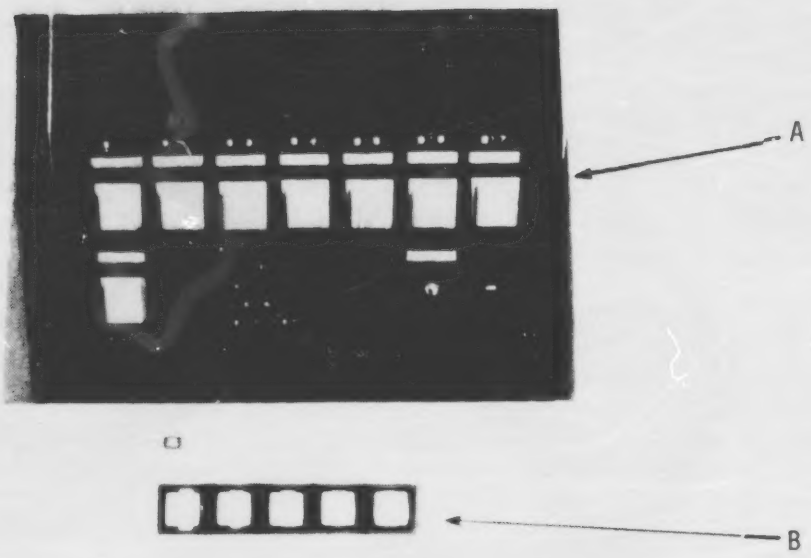
FIGURE 6: REMOTE CONTROL ZOOM LENS

FIGURE 7: CLASSROOM A
INSTRUCTORS' POSITION

A. Instructors' Control Panel

B. Area For Material to be Shot by Top Camera

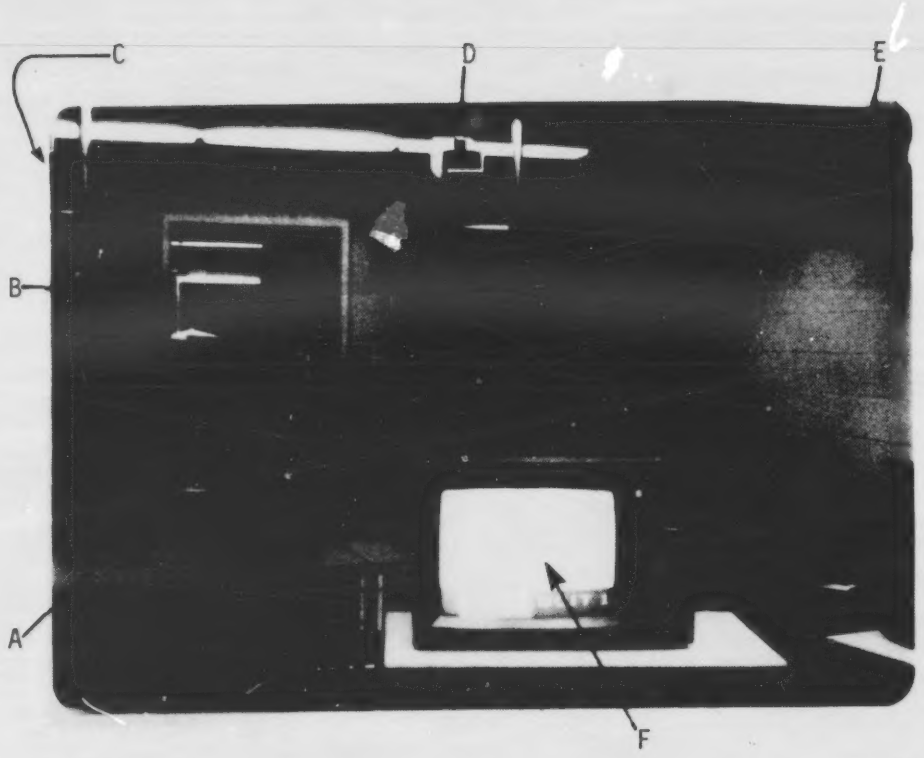
FIGURE 8: CLASSROOM A
INSTRUCTORS' POSITION DESK CONTROL PANEL



A. Interactive Telephone Indicator Lights

B. Telemation Switcher For the 5 Cameras in Classroom A

FIGURE 9: CLASSROOM A
VIEWED FROM INSTRUCTORS' POSITION



A. Camera 5 on wheeled tripod

B. Window to Control Area

C. Camera 3 Left

D. Camera 2 Centre

E. Camera 1 Right

F. Colour TV Set Facing Instructor (Interactive audio and VTR Playbacks heard from TV Set's Loud Speaker)

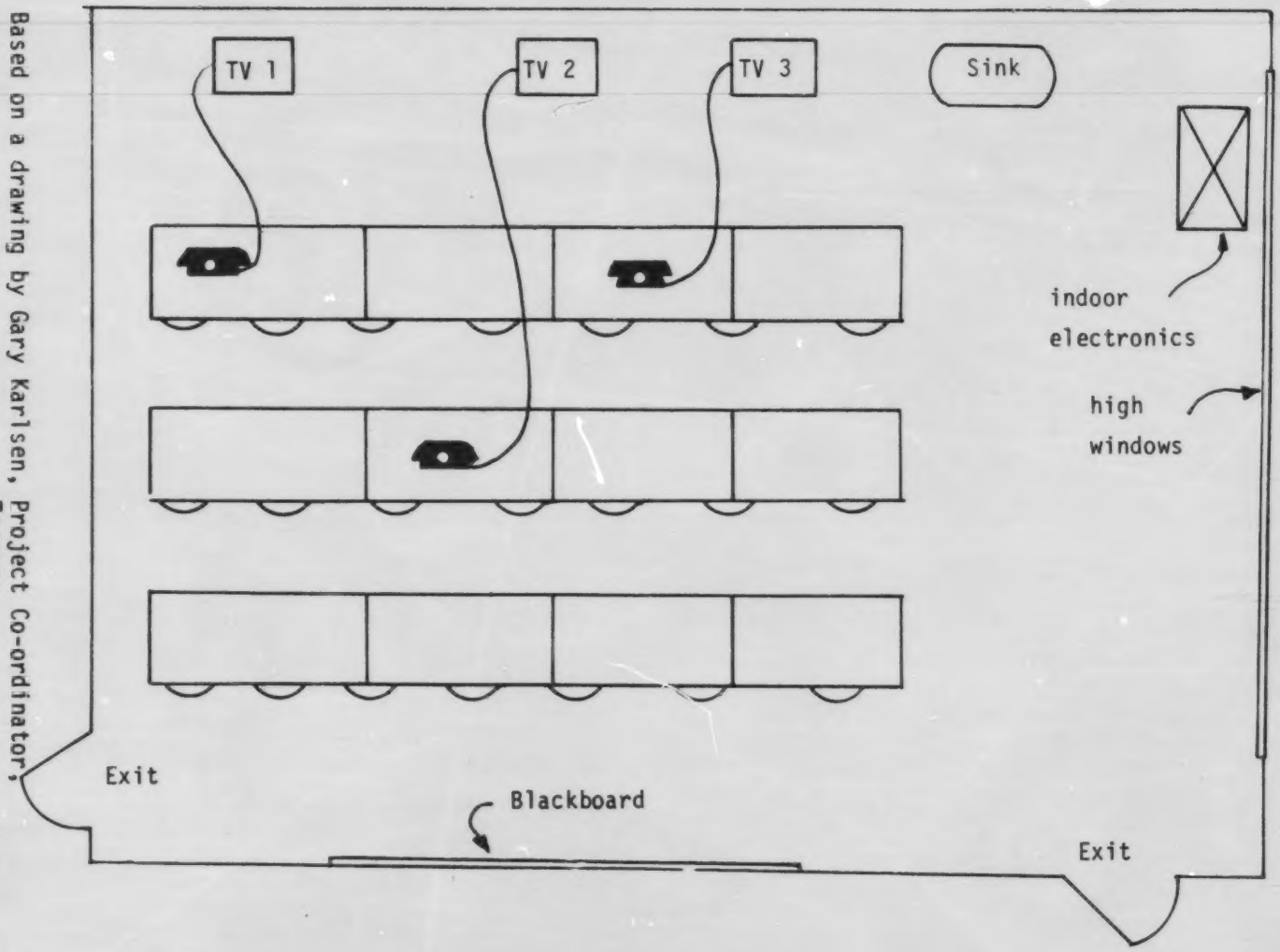
CLASSROOMS AT THE RECEIVING SITES

The classrooms at the receiving sites were allocated to the project from available space at each receiving college. This resulted in a variety of environments ranging from a store room at Mackenzie to a room above a welding shop at Cranbrook.

The basic facilities were a room capable of accommodating from 12-20 students with three to four colour television sets and three to four telephones (satellite interactive) or one conventional land-line telephone.

The classroom at Terrace (North West Community College) is one example of the receiving classroom design used in the IITV project. (See Figure 10.)

FIGURE 10: RECEIVING CLASSROOM AT TERRACE



Based on a drawing by Gary Karlsen, Project Co-ordinator, Terrace

THE VIDEO SYSTEM

The video system was designed to provide the best synchronizing pulse generators[1] and video processing equipment available within the limits the budget would allow. Because the capital budget did not allow top quality for all the equipment the decision was made to buy Leitch products to provide a professional, broadcast base as the heart of the television system and to cut back on camera quality. The industrial quality television cameras could be replaced by cameras of broadcast standard should more capital be made available in the next budget year.

The video switchers used in the IITV systems were manufactured by Telemation. The original design was for two separate five-input, one-output systems. These are broadcast standard switchers but very simple in design (five-input, one-output with no special effects or mix facilities). It was foreseen that these switchers could be moved into other functional positions once the system grew. If production requirements increased, a special production switcher could be purchased, which would interface with the existing sync generators and video processing equipment. When the cameras from classroom B were removed, the two separate video switchers were combined to make one 10-input, one-output switching system. The video input sources were six cameras, two video tape machines (VTRs), colour bars with BCIT identification, and black.

Another early choice was to have one video test package consisting of a test switcher, a broadcast standard colour monitor for colour matching, a broadcast standard waveform monitor and a vector scope. Again, it was crucial to have these items from the beginning so that the standards of the signals being transmitted met broadcast standards.

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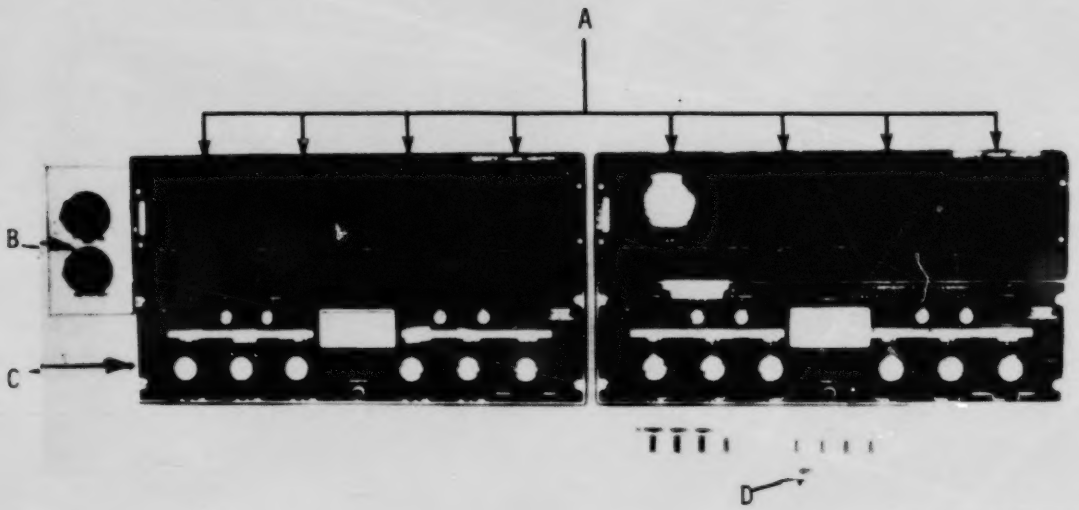
[1] Synchronizing pulse generator: an electronic device which creates vertical and horizontal synchroniztion pulses to stabilize the vertical and horizontal aspects of the television imaging system.

The output of the switchers in the IITV control area fed not only the satellite transmitter but also six classroom television sets in each of the two classrooms, A and B. When some of these television sets were moved across to the large lecture theatre, they could still be fed by the system.

Video tape equipment was originally purchased to record the lectures. However, from the beginning it became apparent that the VTRs would also be used to play back television programmes into the satellite network. This change to the original concept was made because many instructors used slides or films as teaching aids. Since the original design did not include a telecine system, slides and films had to be transferred to video tape through a telecine system located elsewhere. These video tapes were then played back into the various lectures as required. The video tape machines were also used for recording each lecture and any requested duplicates which were sent out by courier to the various community colleges.

FIGURE 11: MASTER CONTROL SWITCHER AND AUDIO MIXER



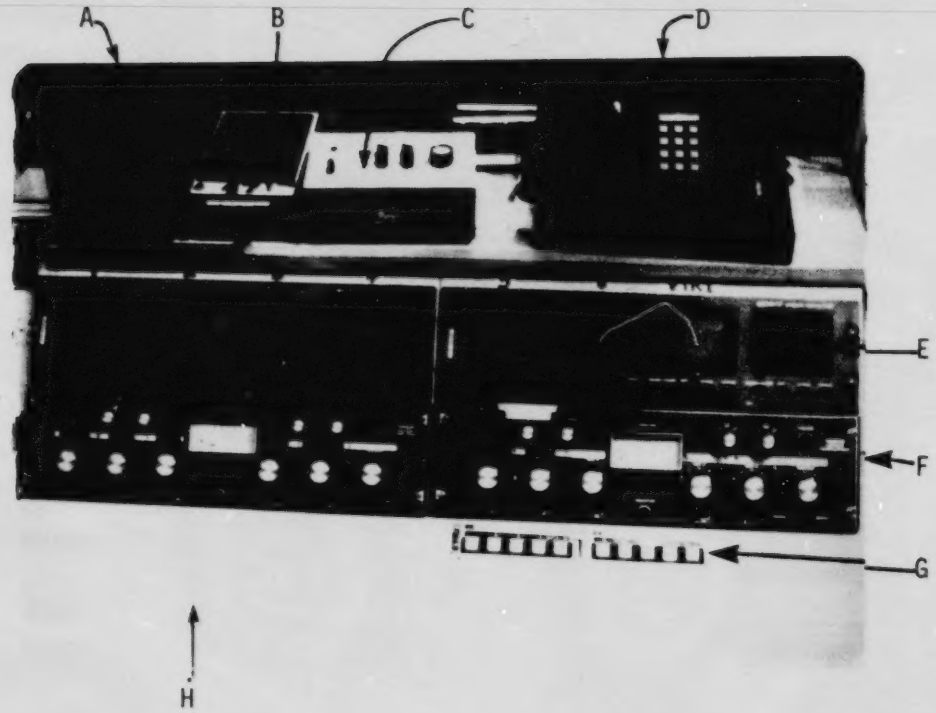
A. House Monitors

B. Audio Monitor Select and Monitor Volume

C. Audio Mixer

D. Video Switcher Control

FIGURE 12: CONTROL AREA
TECHNICAL PRODUCER'S POSITION



A. Wireless Microphone Receiver

B. Audio Cassette

C. Zoom Lens Remote Control

D. Interactive Telephone

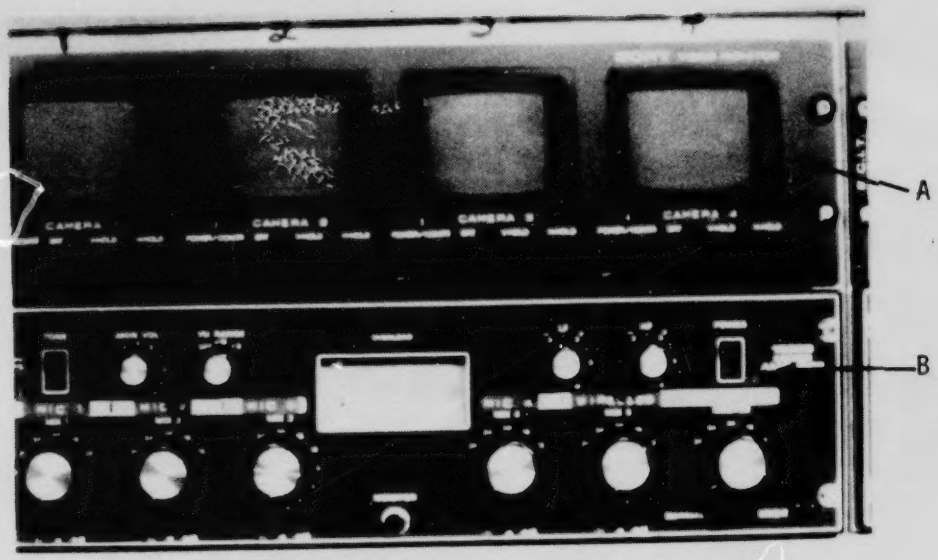
E. Sony B & W 4" Monitors

F. Altec Audio Mixers

G. Telemation Video Switchers

H. Desk

FIGURE 13: CONTROL AREA
TECHNICAL PRODUCER'S POSITION



A. Sony B & W 4" Four Monitor Strip (2 in system)

B. Altec Audio Mixer (2 in system)

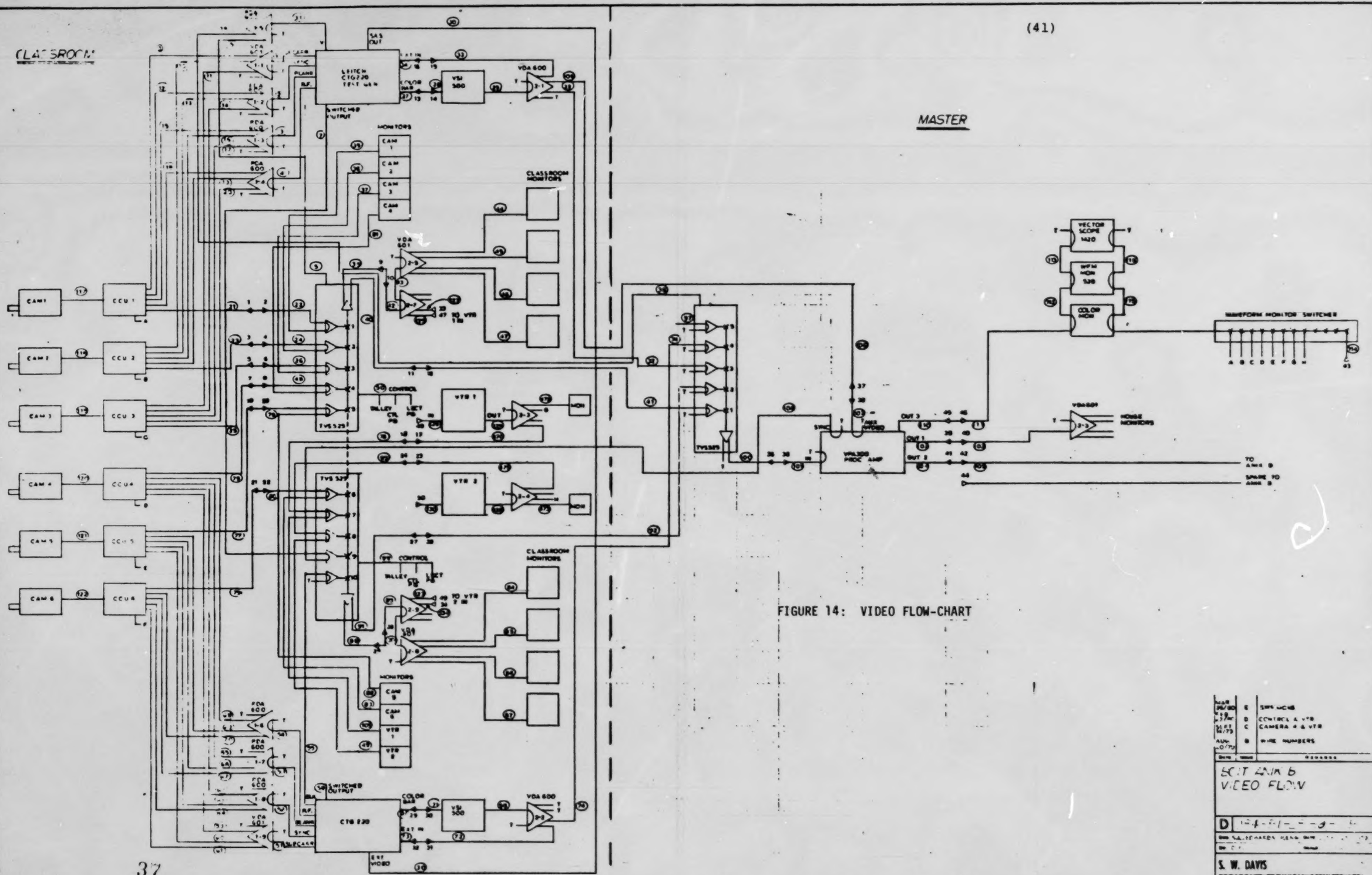


FIGURE 14: VIDEO FLOW-CHART

	E	
	D	CONTROL & VTR
	C	CAMERA 4 & VTR
	B	WIRE NUMBERS
DATE	ISSUE	REVISIONS

SCIT ANN B
VIDEO FLOW

D

S. W. DAVIS
BROADCAST TECHNICAL SERVICES LTD.

THE AUDIO SYSTEM

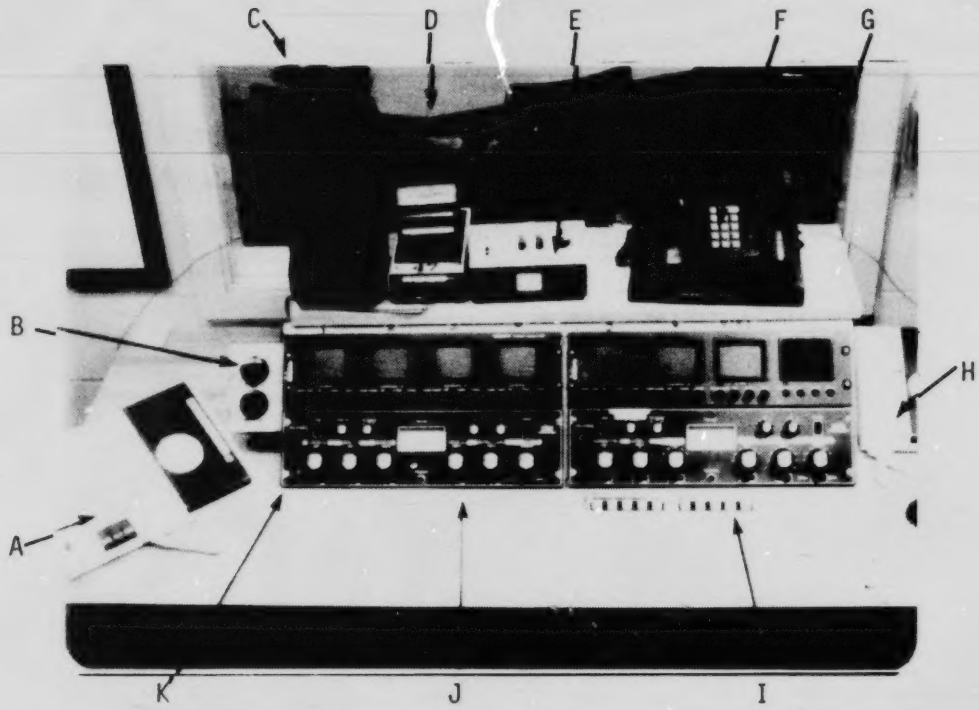
The audio system consisted of two five-input, one-output Altec mixer amplifiers. The original idea was to have two separate control positions. However, when it was decided that classroom B was no longer required as an originating classroom the two audio boards were joined together to produce a 10-input, one-output audio system.

The audio system ran parallel with the interactive telephone network. This satellite interactive telephone network through the Anik-B TVRT earth stations operated from October 1 1979 to mid-June 1980.[1] The input sources to the audio mixing system included four dynamic lavalier microphones, two wireless microphone circuits, one audio cassette machine, and two video tape machines. In addition, the interactive telephony receiving and telephony transmitting channels were mixed in the system. The mixed audio output was fed through an Altec limiting amplifier which guaranteed that a maximum zero db signal was fed to the satellite transmitter. This limiting amplifier guaranteed no over-driving of the transmitter, nor would the signals fed be too low as the limiting amplifier also activated to raise low level audio signals.

---

[1] The receiving stations capable of re-transmitting audio (TVRTs) were moved to a new project in June 1980 and the B.C. Telephone system was then used for feedback.

FIGURE 15: CONTROL AREA
TECHNICAL PRODUCER'S POSITION



A. 9 Over-lines Telephone System

B. Audio Monitor Selector & Gain Controls

C. Wireless Microphone Receiver

D. Cassette Tape Machine

E. Remote Control for Zoom Lens

F. Interactive Telephone

G. Window into Classroom A

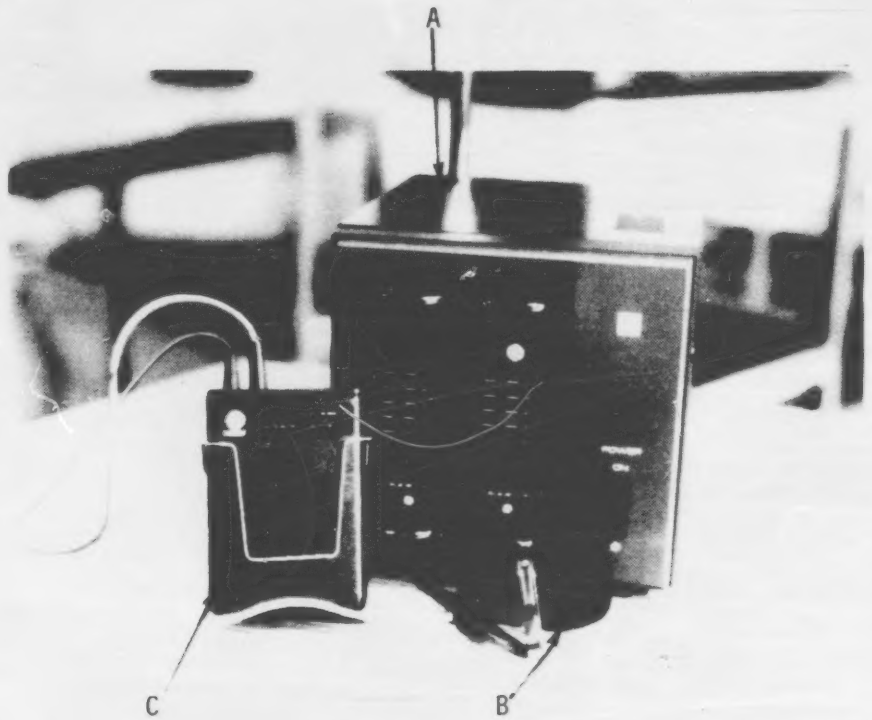
H. Parallel Phone on 9 Over-lines System

I. Telemation Switchers

J. Altec Mixers

K. Sony 4" B & W Monitors

FIGURE 16: WIRELESS MICROPHONE SYSTEM

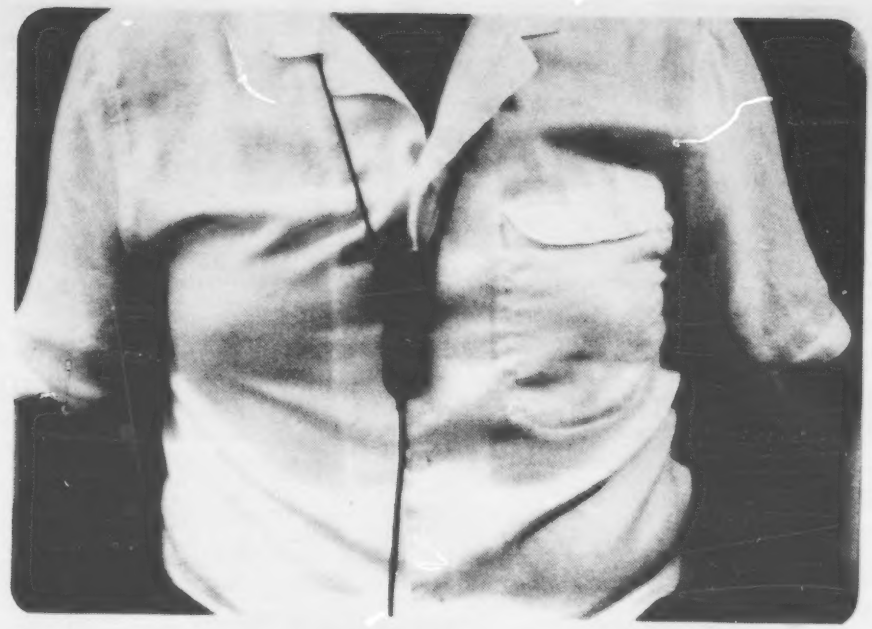


A. Receiver

B. Microphone

C. Transmitter (Battery Operated)

FIGURE 17: LAVALIER MICROPHONE



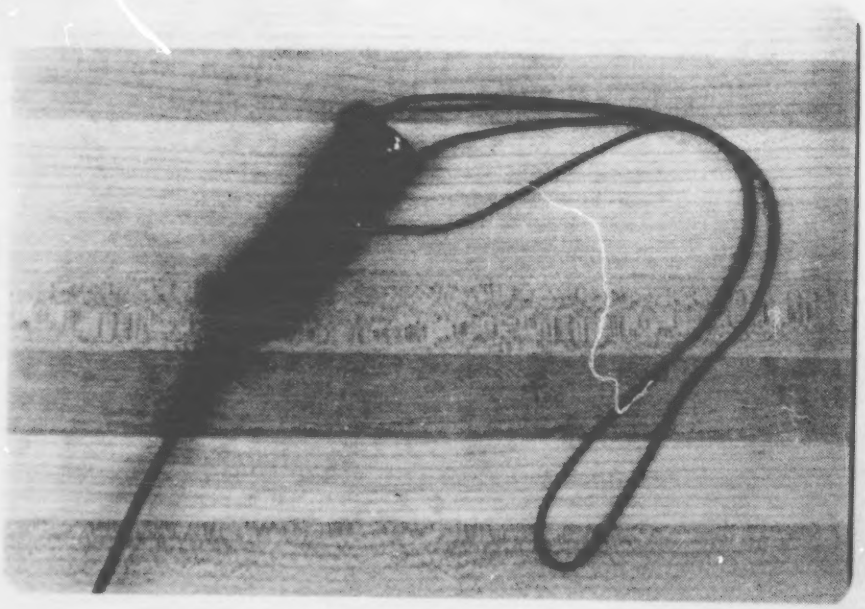
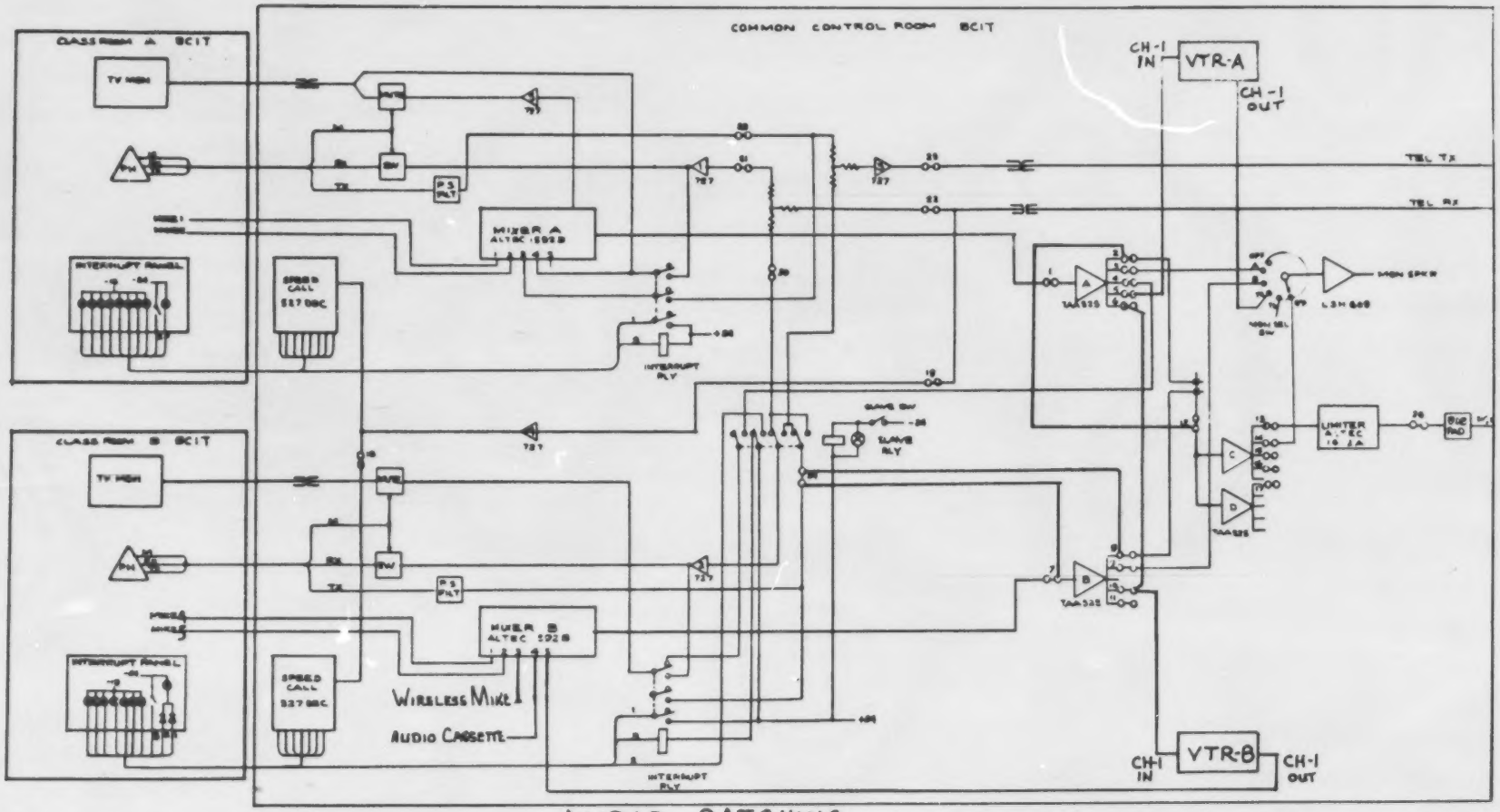


FIGURE 18: AUDIO FLOW



AUDIO PATCHING

MIX "A" OUT	"A" OUT 1	"A" OUT 2	"A" OUT 3	"A" OUT 4	"A" OUT 5	MIX "B" OUT	"B" OUT 1	"B" OUT 2	"B" OUT 4	"B" OUT 5	AUD SW OUT	"C" OUT 1	"C" OUT 2	"C" OUT 3	"C" OUT 4	"D" OUT 1	4W Rx ANIK	4W Rx ANIK	4W Rx SPLTR OUT B	4W Rx SPLTR OUT A	4W ANIK	4W A TX	4W B TX	4W TX SPLTR OUT	LIMIT OUT
"A" AMP IN	AUD SWIN 1	STD A MON IN	STD "B"	TAPE 1 IN	TAPE 2 IN	"B" AMP IN	AUD SWIN 2	STD B MON IN	TAPE 1 IN	TAPE 2 IN	C/D AMP IN	LIMIT IN	MON IN	TAPE 1 IN	TAPE 2 IN	AUX IN	DECOD IN "B"	DECOD IN A/B	CLSRM B IN	CLSRM A IN	SPLTR IN	SPLTR IN A	SPLTR IN B	ANIK IN	ANIK IN
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Source: Oishi, M., B.C. Tel.

THE SATELLITE SYSTEM

All the satellite-related equipment used in the IITV project was provided by DOC. This equipment consisted of the television transmitting/receiving (TVT) trailer with a three-metre antenna and related transmitting and receiving equipment. The satellite receiving equipment was either interactive or non-interactive. There were six TVRT interactive earth terminals located at Cranbrook, Dawson Creek, Port Alberni, Prince George, Terrace and Whitehorse. In addition to the TVRTs, LCETs (low cost earth terminals) were installed at Fort Nelson, Fort St. John, Gold River, Mackenzie and Prince Rupert.

The satellite used in the project is the Anik-B satellite owned by Telesat Canada. IITV made use of one of the channels on the 12-14 GHz system aboard the satellite. This channel was capable of transmitting at least one television signal, three audio signals and one telephony signal simultaneously. The IITV project was using the western spot beam which covers British Columbia, Yukon and 90% of Alberta.

The regular transmission process from BCIT was similar to a normal television programme in terms of colour video and programme sound. Students who wished to interact with the instructor from the interactive sites used a four-wire telephone. The instructor heard the student's comments as did all other people concurrently using the IITV system.

In the case of the non-interactive sites, students used a conventional land line telephone to dial the control room number at BCIT. Their telephone calls were phone-patched into the audio system so that the instructor and all other participants in the IITV system could hear the student's question.

On June 1, 1980 DOC began removing the satellite interactive terminals for shipment to another project in the Northwest Territories, north of Manitoba. Replacement LCETs were installed in Prince George, Cranbrook and Port Alberni. In addition, the LCETs were kept in Fort St. John, Fort Nelson, Gold River and Mackenzie. This reduced the IITV network, during the summer of 1980, to a total of seven satellite non-interactive receiving sites which meant that all participating students at the receiving sites had to use land line telephones to interact with the instructors at BCIT.

To restore the ability of the students to interact with the instructors and each other regardless of their location, B.C. Tel installed in the audio system at BCIT, a new telephone conferencing system with nine overlines. This new telephone system had an additional feature which increased resources for the instructor and the students: it was now possible for the instructor to have the control room operator telephone a resource person at their home or place of work and patch that call into the system. This meant that the resource person could simultaneously:

1. hear the instructor because the instructor's microphone was connected to the telephone system;
2. hear and interact with any student calling in. All students in the system would hear this interaction over their television sets.

In addition:

3. as before, the students in classrooms A and B and the lecture theatre used the interactive telephones to ask questions of the instructor so that all students could hear the question;
4. as before, students in classrooms A and B and the lecture theatre were able to use the interactive telephones to discuss points with any students calling in.

FIGURE 19: COVERAGE MAP - RECEIVING SITES

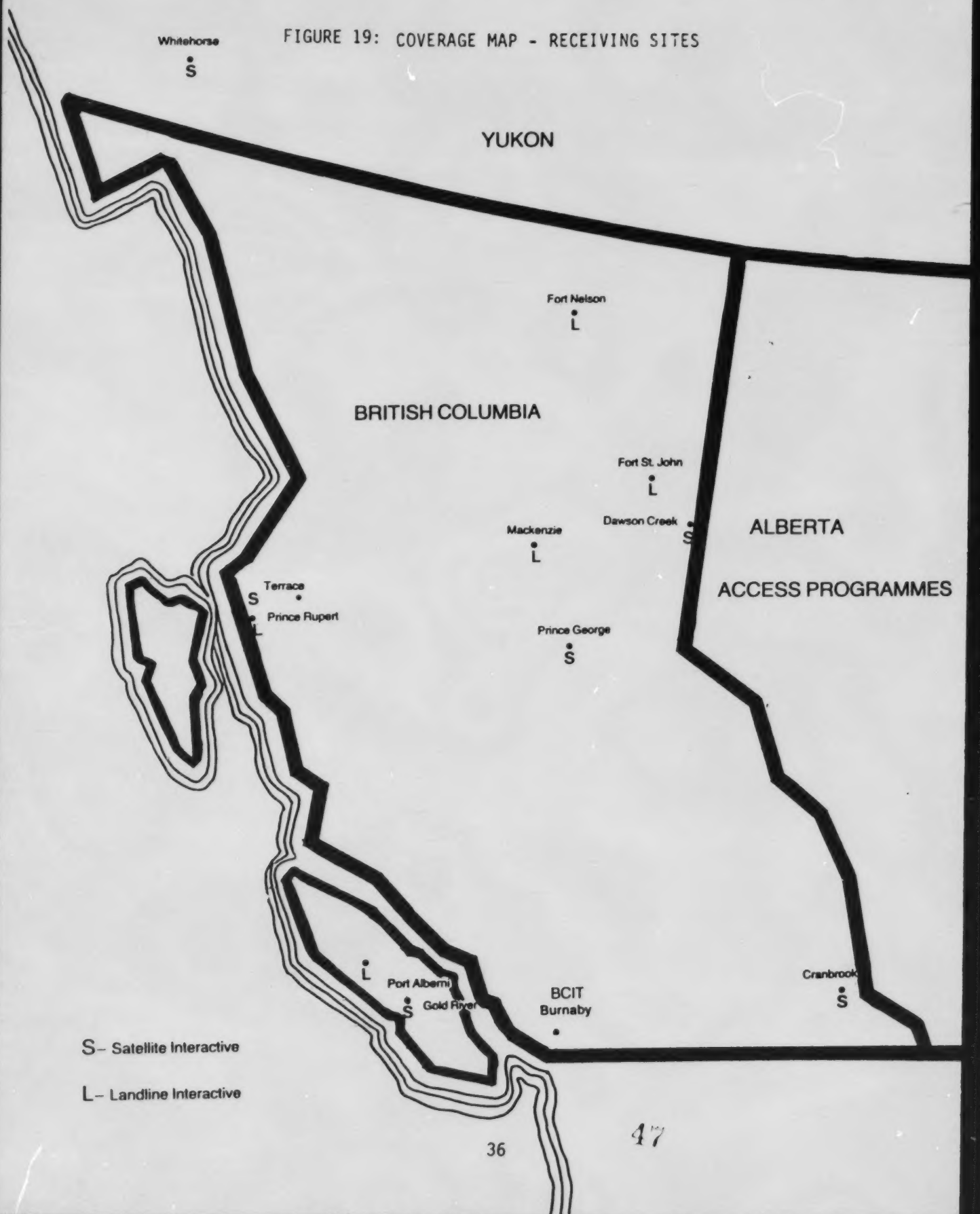


FIGURE 20: ANIK-B TRANSMIT CONTOURS (eirp 46.5 dBw outer contour, 49.5 dBw inner contour)

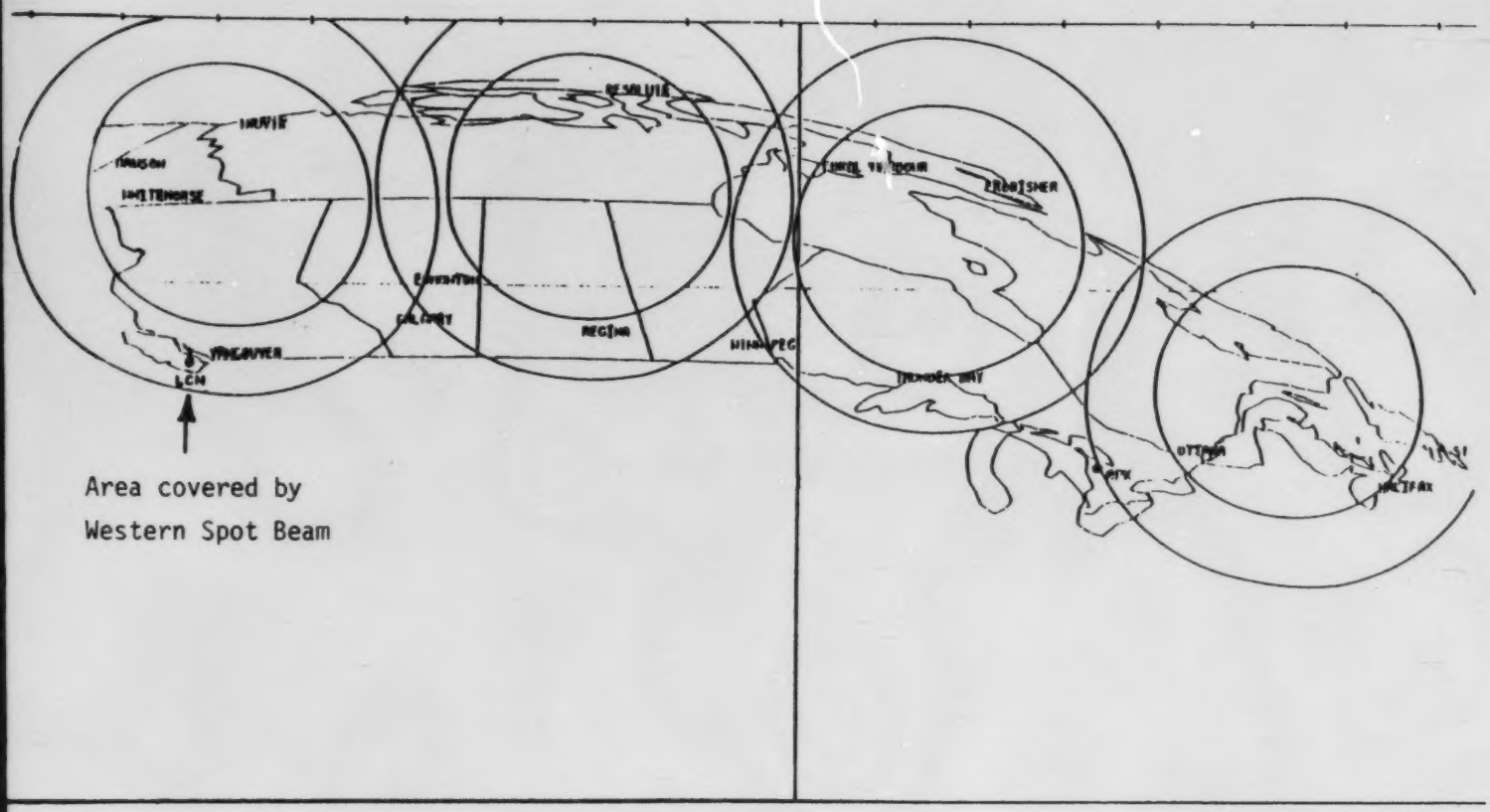
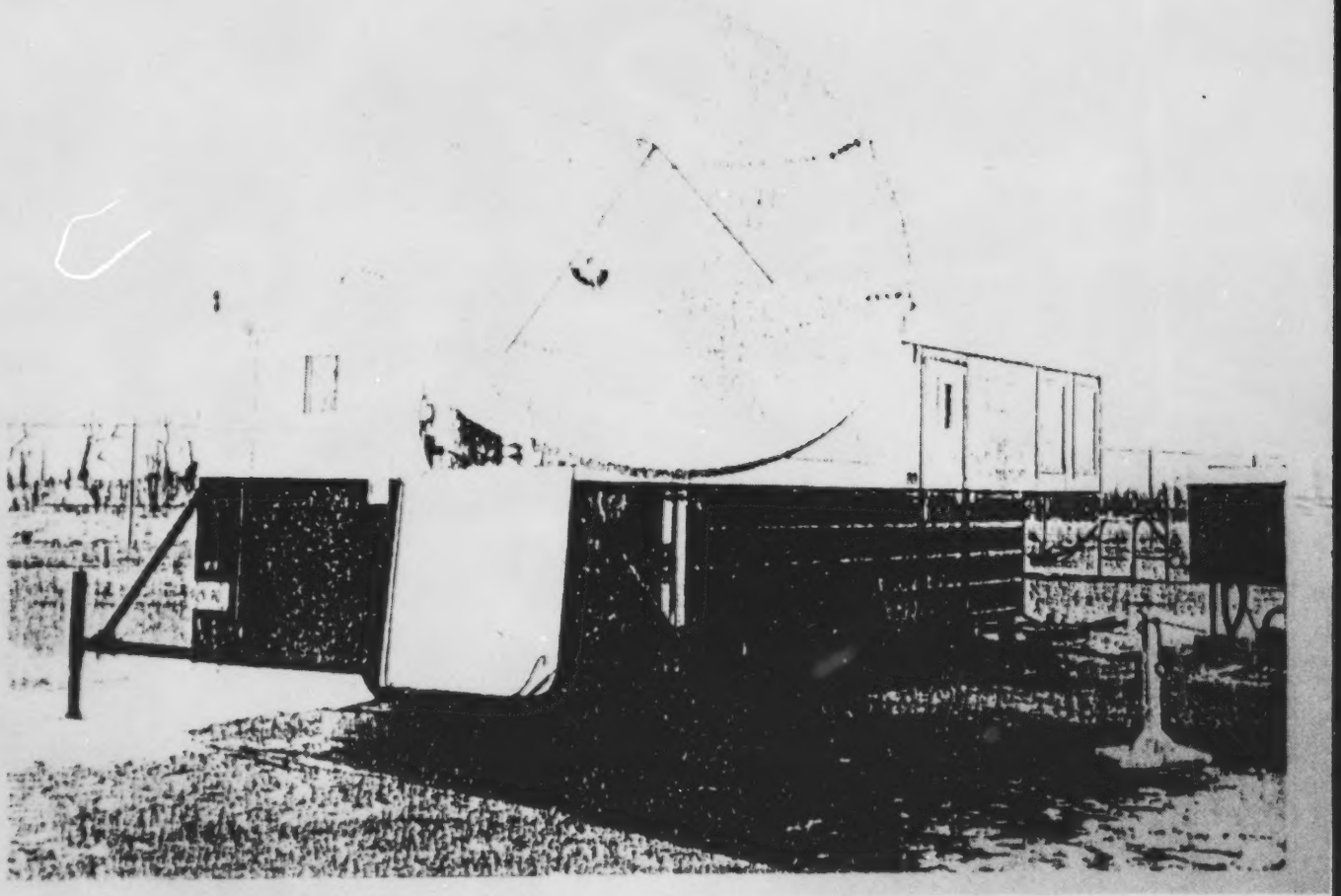


FIGURE 21: TVT TRAILER

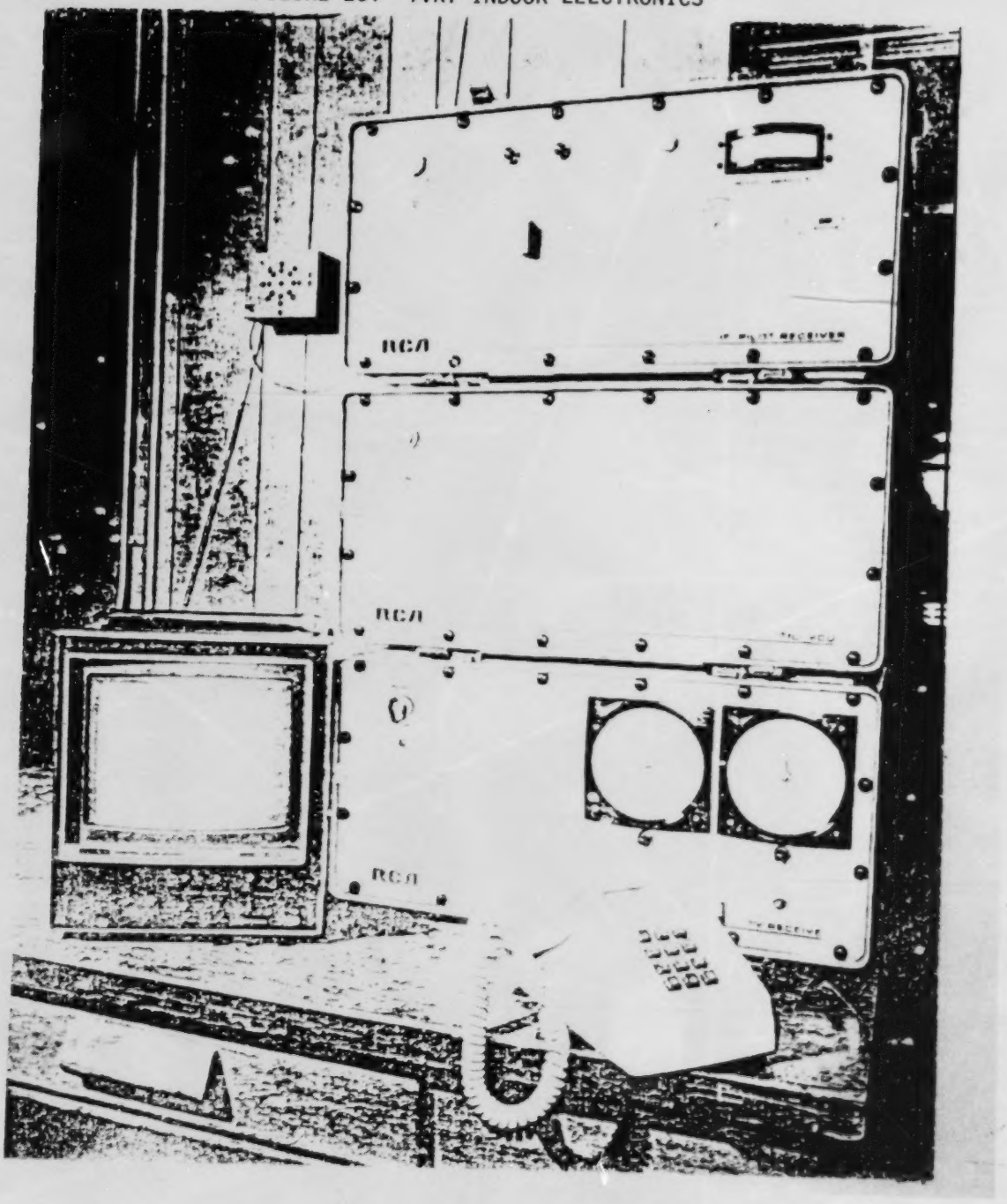


Source: Day W.J.B., Anik-B DOC Communications System and Ground Terminals

FIGURE 22: TVRT TERMINAL

Source: Day, J.W.B., Anik-B DOC Communications System and Ground Terminals

FIGURE 23: TVRT INDOOR ELECTRONICS



Source: Day, J.W.B., Anik-B DOC Communications System and Ground Terminals

OPERATING THE SYSTEM

From the beginning, the intention was to keep the operation as simple as possible and the design of the control room at BCIT was very simple; effectively a one person operation. The operator sat directly behind a small control console which housed eight 4-inch black and white Sony monitors. These displayed the inputs from the six colour cameras and the two video tape machines. Directly below the eight black and white monitors were the ten-input, one-output audio board and ten-input, one-output video switcher.

Between the control console and classroom A a double-glazed window allowed the operator direct vision into the classroom. Directly behind, on the other side of the control platform were the two record-playback video tape machines. Located over the operator's left shoulder were the equipment rack panels. Rack 1 contained the video sync generation equipment, the video processing and distribution equipment, the camera control units for balancing the colour from each camera, and the video identification system. Rack 2 contained the video test package, consisting of one broadcast colour monitor, a vector scope, a waveform monitor and a 12-input, one-output test selection switcher. Rack 3 contained the audio equipment supplied by B.C. Tel including the telephone conferencing system. The operator, sitting in one position, was able to reach comfortably all of the selection switches for audio and video, start and stop both video tape machines and monitor the quality of colour pictures and sound levels fed to the satellite network. Straight ahead through the window into classroom A the operator was able to see the instructor clearly and was therefore able to pick up and send pre-arranged hand signals.

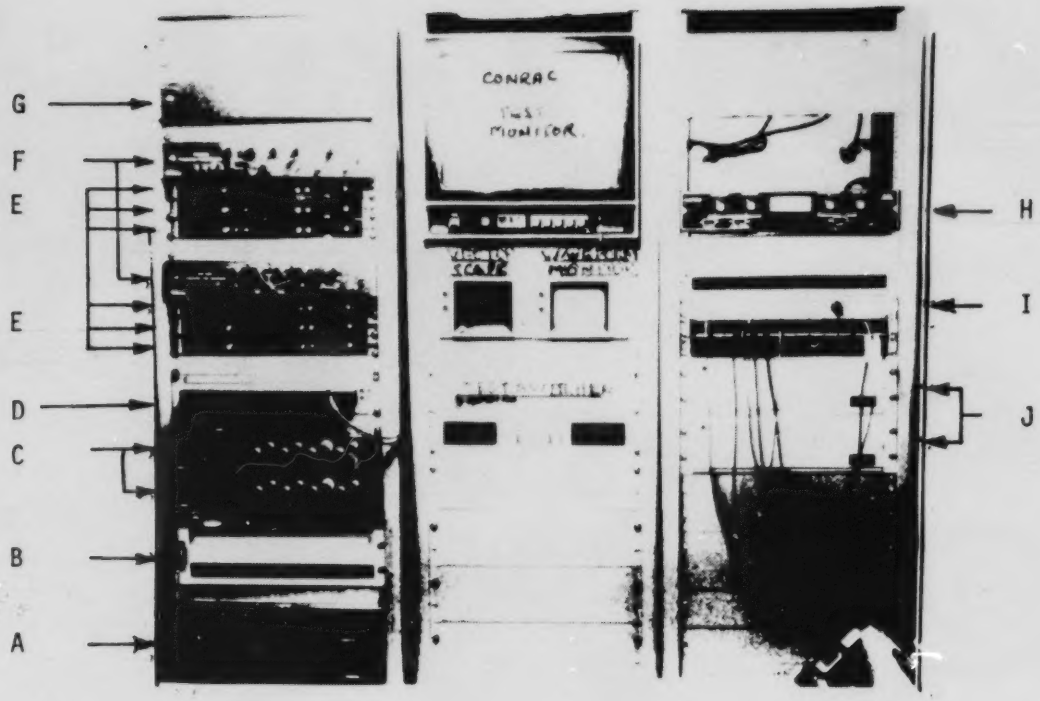
There were five cameras positioned in classroom A. Three cameras were suspended from the centre beam in the ceiling to take semi-permanent fixed shots. These ranged from a medium close-up to a wide angle view of the instructional area depending on whether there was a single instructor teaching the class or a panel of anywhere from two to eight involved in a teleconference. The fourth was an overhead camera pointing down on the instructor's desk. This camera was later equipped with a zoom lens which allowed remote control zooming and focussing on various sized paper, transparencies or other materials supplied by either the instructor or the teleconference chairman. The fifth camera on a wheeled tripod at the back of the classroom allowed for individual medium close-up shots of any speaking member of a teleconference panel. This camera was operated by students from the Broadcast Communications Department who were brought in whenever the occasion demanded the use of the tripod-mounted camera. The sixth camera was located near the racks on the control platform. Its main function was to shoot network identification and information graphics.

The microphones used in the system were of two kinds: corded lavalier microphones, worn suspended from the neck and battery-operated wireless microphones which allowed the wearer to move about freely. The instructor or chairman of the teleconference was able to hear people responding through the interactive circuits over the loudspeakers located in the television sets in the classroom and, while the interactive system was running through the satellite, students at the interactive sites were able to activate indicator lights on a panel in the instructor's desk which showed where they were speaking from.

If the instructor or chairman of a teleconference wished to change the camera shot, there was a five-input parallel switcher incorporated into the instructor's desk which allowed him to select any of the five cameras in classroom A.

The operation of the system was therefore both simple and flexible.

FIGURE 24: RACKS



A. Leitch Video Distribution Amplifiers

B. Telemation Video Switcher

C. Leitch Processing Amplifiers

D. Trompeter Video Patching

E. JVC Camera Remote Synchronization Units

F. Leitch Calibration Test Generator

G. Leitch Video Distribution Amplifier

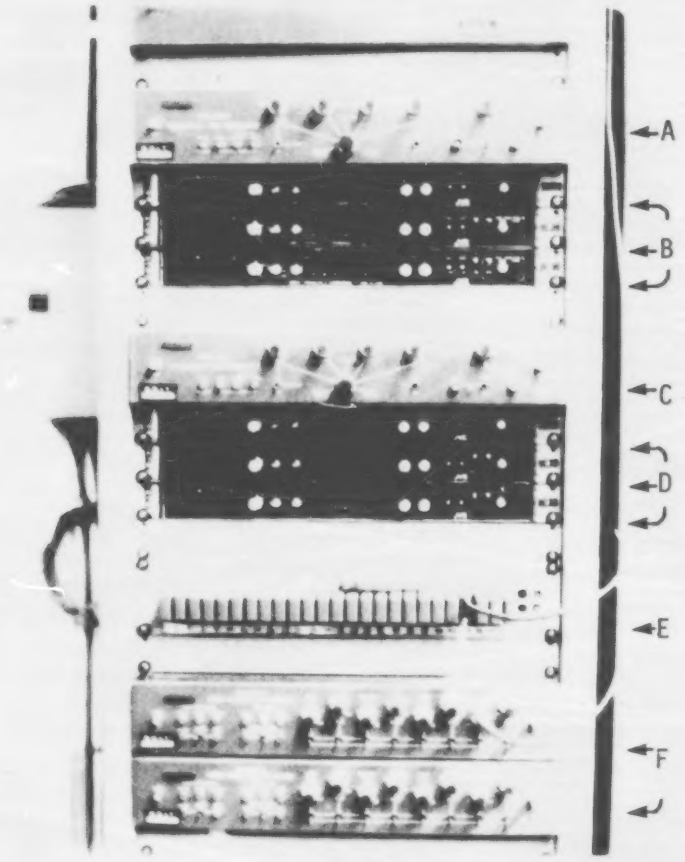
H. Altec Limiter Amplifier

I. Audio Patching

J. Speed Call Telephony Receivers

FIGURE 25: RACK 1

VIDEO EQUIPMENT INSTALLED BY BROADCAST TECHNICAL SERVICES



A. Leitch Sync Generator

B. JVC Camera Remote Synchronization Units

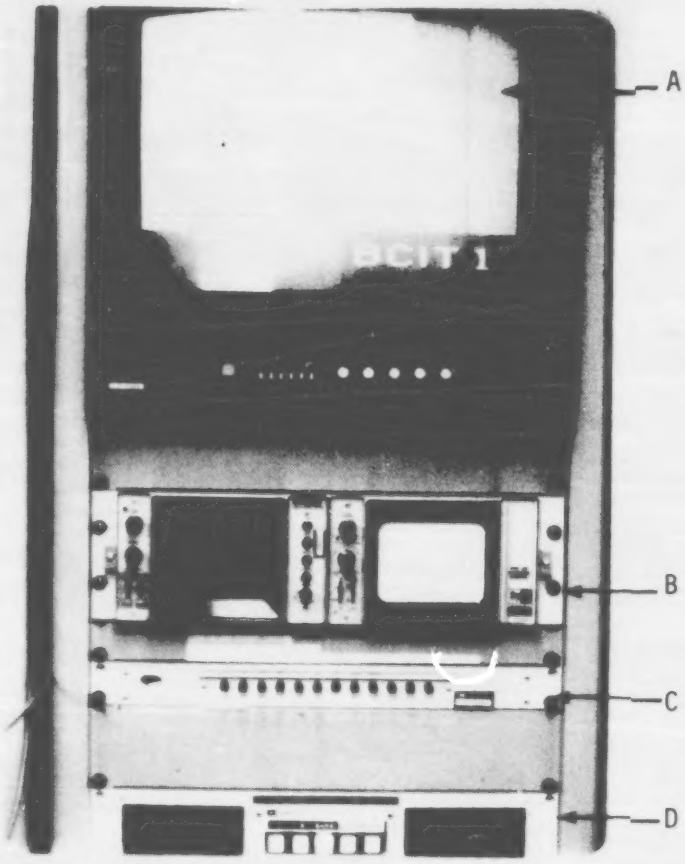
C. Leitch Sync Generator

D. JVC Camera Remote Synchronization Units

E. Trompeter Video Jack Field W U-Links

F. Leitch Video Processing Amplifiers

FIGURE 26: RACK 2
VIDEO EQUIPMENT INSTALLED BY BROADCAST TECHNICAL SERVICES



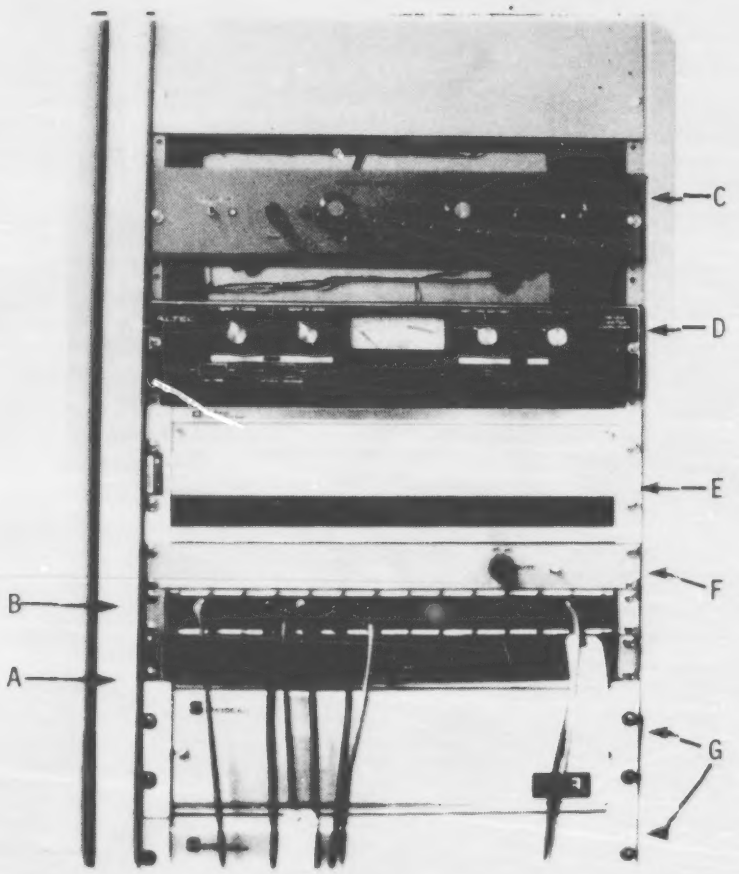
A. Conrac Colour Monitor Showing Colour Bars and Identification

B. Test Equipment Tektronix Vector Scope and Wave Form Monitor

C. Dynair Video Test Switcher

D. Telemation Video/Audio Switcher to TVT

FIGURE 27: RACK 3
AUDIO EQUIPMENT INSTALLED BY B.C. TEL



A. Audio Distribution Amplifiers

B. Audio Jack Field

C. Telephone Muting System

D. Altec Limiting Amplifier

E. Telemation Audio Switcher

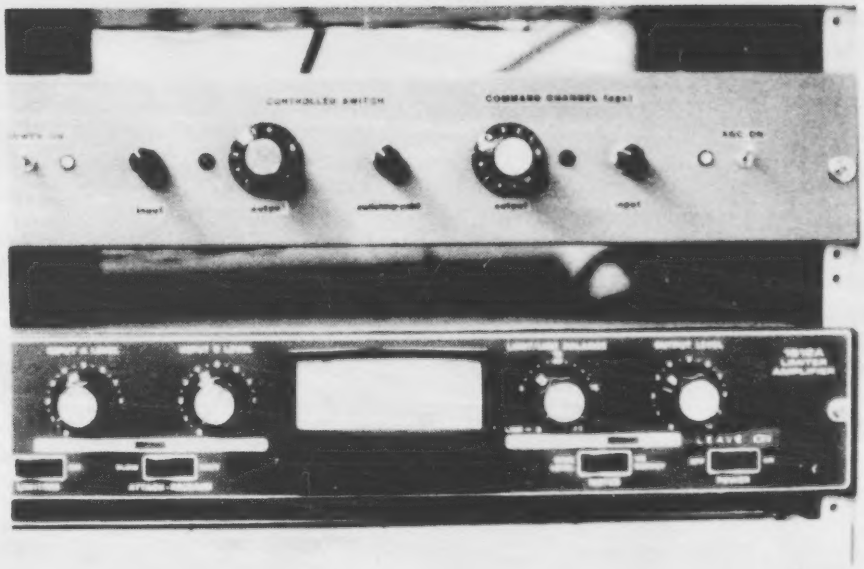
F. Interactive Telephone System for Classroom B

G. Speed Call Processors

FIGURE 28: RACK 3
MUTING SYSTEM AND AMPLIFIER

A

B

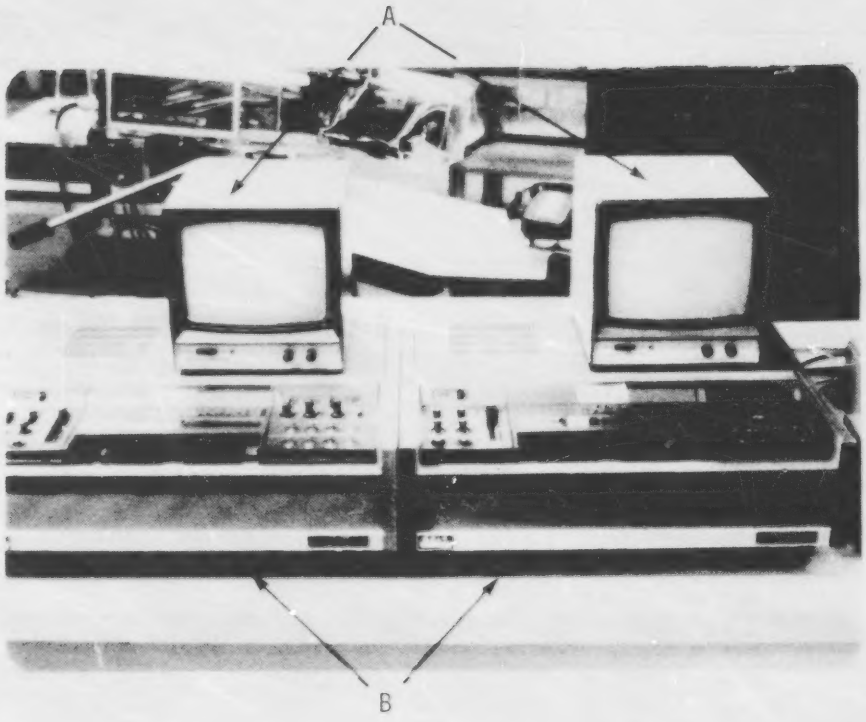


A. B.C. Tel Custom Built Telephone Muting System

B. Altec Limiting Amplifier

FIGURE 29: REMOTE CONTROL UNIT FOR ZOOM LENS

FIGURE 30: CONTROL AREA: VTR DESK



A. Electrohome B & W Monitors

B. JVC Playback & Record Video Cassette Tape Machines

DAILY OPERATIONS

The IITV project employed three full-time operations staff: a co-ordinator[1] and two technical producers[2]. The Co-ordinator of Technical Services and Operations was responsible for the overall technical and operational aspects of the programme. Specifically, he was responsible for: the design and layout of the equipment at BCIT and for making recommendations for the design and layout of the monitoring and interactive equipment at each of the receiving sites; assessing the need, design and cost for new equipment or modifications to existing equipment; the setting up and testing of experimental equipment for new programming ideas; the maintenance of equipment at BCIT; and the administrative and operational procedures used at the BCIT IITV Centre. In addition to these responsibilities, the co-ordinator was designated by the Communications Research Centre (CRC) of DOC, Ottawa as their operations contact for questions relating to weekly transmission schedules, special transmissions, satellite system operations and maintenance in the case of breakdown in the satellite system equipment assigned to the project.

The technical producers were responsible for: organizing and up-dating the master schedule for all programming; assisting in assessing the need and the ordering of equipment and supplies for the project; video tape duplication, cataloging and storing; producing instructional and promotional video tapes; some routine maintenance of equipment; network routing procedures and all on-air operations.

---

[1] Robert Nason
[2] Deanna Giles and David Billman

Scheduling

The IITV project was allotted nine hours of satellite time each day, Monday through Thursday and six hours on Fridays as well as occasional additional time for special programming. Of this time, two hours per day were used by the Alberta Educational Communications Corporation (ACCESS) for playback of instructional video tapes from BCIT to eight locations in Alberta. Several programmes had time slots which they held throughout the project. However, many programmes were short-term and required constant checking to ensure that users appeared when scheduled and that two programmes were not scheduled into the same time slot. As satellite time had to be confirmed weekly with the CRC in Ottawa, the technical producers were constantly checking on the status of new programmes so that they could plan as far in advance as possible. It was desirable to fill all allotted satellite time and this was usually done. However, cancellations did occur and care had to be taken to inform the CRC immediately to avoid having operators in Ottawa standing by to monitor a programme that was not transmitted.

Equipment and Supplies

The technical producers were responsible for assessing the need for supplies and equipment for daily operations of the project and for ordering them. This included all office supplies, graphics materials, video tape, set decorations, designing and ordering technical forms and labels and ensuring that equipment maintenance was completed as quickly and efficiently as possible. As there were no full-time engineers assigned to the project, the technical producers had to carry out some minor maintenance and be capable of isolating a problem in the event of a technical breakdown. Maintenance included registration of cameras, adjustment of the camera control unit (CCU) setup and gain controls and cleaning of VTR video heads. If a problem occurred, the technical producers had to be able to remedy it immediately or to patch around it. If a technical producer was unable to correct a problem, an engineer was called in or the equipment was sent out for repairs.

Video Tape Duplication and Storage

Technical failure or missed classes in the remote colleges made a large number of video tape duplicates necessary to ensure that all students had an opportunity to view the classes in which they were registered. Since the demand was high, student operators were hired from the Broadcast Communications Department on a part-time basis to complete any duplication that the technical producers could not handle. As the IITV Centre's equipment was in constant use and was only capable of making one copy at a time, multiple-copy duplication facilities, located at PEMC[1] situated at BCIT, were made available to the project. The technical producers delivered master tapes and blanks to the PEMC's duplication facility where student operators worked between midnight and 8:00 a.m. and on weekends as assigned. The technical producers collected the completed duplicates and delivered them to BCIT's Directed Study Centre (DSC)[2]. Staff at the DSC sent these tapes by courier to the colleges requiring them. As a result of video taping each class and making many duplicates, the IITV Centre came to own a substantial amount of video tape.

A record of those tapes sent to the colleges was kept in the IITV Centre and an accurate system of cataloging was maintained. This included assigning a course code name and number to each tape and maintaining a separate log sheet for each course. When a student in one of the colleges wanted a copy of a particular session the technical producers had one made and sent. Some agencies wanted to keep complete copies of their courses. In this case they arranged to purchase copies through the Directed Study Centre. All master tapes were kept at the IITV Centre and selected tapes from each course were retained for the archives. Those tapes no longer required were erased after authorization by the relevant instructor or agency.

---

[1] Provincial Education Media Centre
[2] DSC is part of the Distance Education Department within the Division of Continuing Education and Industry Services.

Visual Aids Production

The technical producers were responsible for assisting and advising instructors on visual aids production. This included graphics preparation and the transferring of slides and films to video tape. As the IITV centre was not equipped with a telecine chain, slides and films had to be transferred to video tape for playback through the system. The facilities used for transferring film and slides to video tape were made available to the project by the Broadcast Communications Department at BCIT. These consisted of a colour telecine chain and a video tape machine of identical format to the VTRs at the IITV Centre. Instructors were asked to give two week's lead time for any transferring required because of the difficulty in booking facilities. Students[1] were hired on a part-time basis for transferring and they picked up slides or film from the IITV Centre and delivered the finished product to the Centre's control room.

Instructors were given advice on how to produce graphics for use in the television format. When a new course was scheduled, the instructors were contacted and asked to talk with the technical producer, who discussed the format, card size and print size of graphics and gave examples to the instructor. Following this discussion, it was the instructor's responsibility to have graphics produced in the correct manner. The technical producers made title graphics for all courses, copyright acknowledgement, standbys and network identification.

---

[1] Students from the Broadcast Communications Department hired as part-time employees.

In addition, the co-ordinator and his staff produced a limited number of demonstration and promotional video tapes to be played back through the system or to interested agencies. Production of such tapes was minimal because of the lack of production facilities available. If production of a tape was required, it was necessary to obtain the use of facilities located at BCIT's Audio Visual Department or UBC's Bio-medical Instructional Resources Centre and to hire a crew.

On Air Operations

The majority of the technical producers' time was spent in preparation for and on satellite transmissions. One half hour before air time all equipment was turned on and checked. Instructors were encouraged to arrive at this time if they had not previously used the system or if they had special instructions for the technical producers. Depending on the number of people on camera, the portable addition for the instructor's desk was set in place or removed. Camera positions were selected depending upon the style of teaching and the number of instructors. Instructors were encouraged to move around and teach a class as they normally would, keeping in mind the restrictions imposed by the microphones and cameras. All graphics were checked and a system of hand signals was arranged between the technical producer on duty and the instructor. This was necessary to avoid instructors requesting camera changes or referring to the "technicians in the back" as the technical producers always attempted to keep the television system as unobtrusive as possible.

Ten minutes prior to air time the technical producer telephoned the TVT operator and asked to be patched through to the satellite. Up to this time the TVT operator would have been playing music over a DOC identification graphic. Once patched through, the technical producer switched to the IITV network identification graphic shot by the graphics camera and performed pre-programme checks. These consisted of

establishing contact with the receiving colleges and checking the signal strengths of their receiving equipment. This was done by a staff member at the receiving college who took a reading from the signal strength meter on the indoor receiver located at his facility.

At one minute to air, the technical producer selected colour bars on the video switcher and tone from the audio board. One or both VTRs were put in record mode and thirty seconds of bars and tone were recorded, followed by a copyright acknowledgement. The technical producer then switched to the course title graphic shot by the overhead camera in classroom A. At the precise starting moment the technical producer selected the camera shooting the instructor and the class was "on the air".

As instructors were asked not to request camera changes, the technical producers had to pay close attention to the class in order to be ready to make the required changes. This was particularly critical when switching between the instructor and the overhead camera as students had to be able to see any notes the instructor was writing or referring to directly. The technical producers had to be aware of any movements made by the instructor since pre-arranged hand signals could be embedded in these movements. Also, an instructor might get up and walk around or move to an area while a demonstration was being set up. The technical producers had to be able to follow this action with proper switching techniques. The camera shots had to be properly set up in advance and the instructor made aware of the limitations of the fixed camera system to avoid jump cuts, matching shots or the instructor walking out of camera range.

Before the start of a transmission, instructors were shown how to use the interactive system. In some cases, instructors would ask the students located at the interactive colleges to push a series of three touch-tone buttons on their telephones: this created a series of tones which illuminated an indicator on a panel located on the instructors' desk. This showed the instructors the origin of the call. In other cases, students simply picked up their telephone receiver, identified themselves and asked their question. Students located at sites which had no satellite interactive equipment called a long distance number which rang in the control room. The technical producer answered the call, ascertained that it was indeed a student calling and, using a telephone patching device, connected the call to the audio board. The instructor in classroom A heard the student's question from the loud speakers on the television sets in the classroom. The student at a non-interactive site had to be near his television set to hear the instructor's answer. If the student was calling from outside his classroom, the instructor had to pick up the extension telephone receiver on his desk and speak directly to the student.[1] (The telephone system modifications are described on page 35 of this report.)

Depending on the length of the programme, the instructor allowed a ten to fifteen minute break. The time for the break was flexible and was at the instructor's discretion. The technical producer knew approximately when it would occur and was ready with a break graphic. When the class recessed, the technical producer selected the graphics camera and played background music from the audio cassette machine. The graphic stated what time the class was scheduled to continue and the instructor was encouraged to start at that time.

---

[1] From October until the end of December, 1979 students at Mackenzie had to use a pay telephone located in a different building.

At the end of the class, the instructor signed off and the technical producer selected the IITV identification network graphic and told the TVT operator when the next programme would be transmitted. The camera irises were closed and the studio lights turned off. If it was the last transmission of the day the technical producer turned off the equipment as required, labelled and catalogued the day's tapes, left appropriate messages for the morning technical producer and locked up.

Paperwork

Pages 58 to 63 inclusive show examples of IITV forms in the following order:

Example 1 - Fault Report
Example 2 - Video Tape Cue Sheet
Example 3 - Technician Schedule
Example 4 - Video Cassette Log
Example 5 - Daily Log
Example 6 - VTR Labels

Example 1

FIGURE 31:

IITV – BCIT

FAULT REPORT

REPORTED BY: **DATE:**

CHECKED BY: **TIME:**

NATURE OF FAULT:

DATE RETURNED TO SERVICE:

COMMENTS:

FIGURE 32: Example 2

IITV – BCIT

VIDEO TAPE CUE SHEET

PROGRAM: **TAPE NO.:**

INSTRUCTOR:

OP.	DATE	FROM	TO	LENGTH	CONTENT	ERASURE

FIGURE 33: Example 3

IITV – BCIT
TECHNICIAN SCHEDULE

LEGEND:
D – DAYSHIFT
8:30 am – 4:30 pm
N – NIGHTSHIFT
12:00 noon – 10:00 pm

DATE	DAY	SHIFT (D/N)	TECHNICIAN	CHANGES/COMMENTS

IITV – BCIT

FIGURE 34: **VIDEO CASSETTE LOG** Example 4 **MASTER**

DATE	INSTRUCTOR	PROGRAM	SESSION	RELEASE FOR ARCHIVES	RELEASE FOR LIBRARY	MASTER LOAN				ERASED
						NAME	OUT	IN	TAPE NO.	

FIGURE 35:

DAILY LOG

Example 5

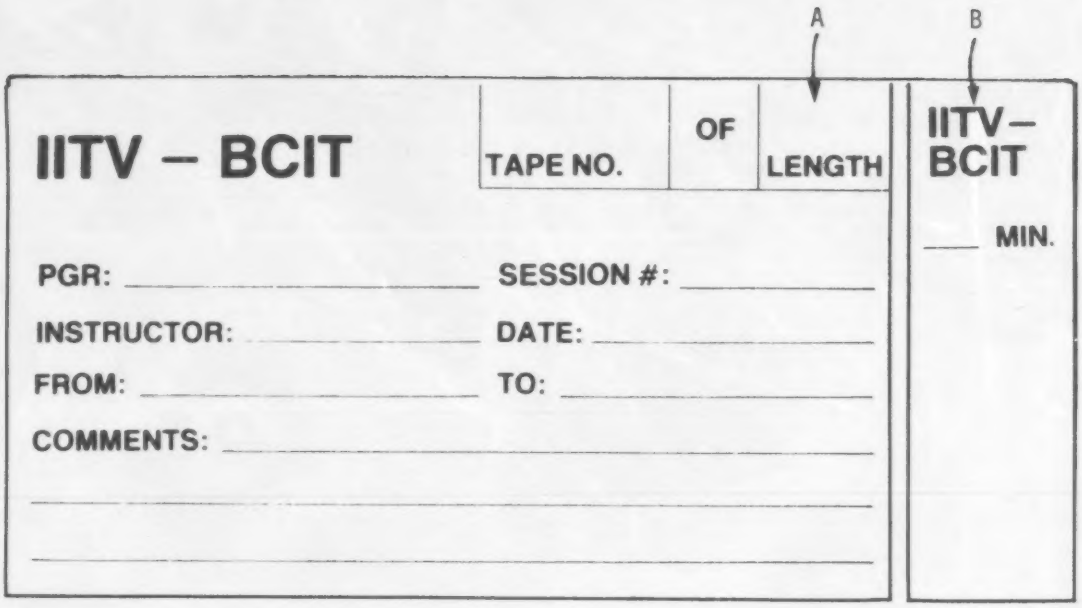
IITV – BCIT

DAY DATE PAGE

BROADCAST TIME ON	BROADCAST TIME OFF	RECEIVE SITES	TEMP.	METER READ 1	METER READ 2	CONTENT	LENGTH	REMARKS
								75
74								

62

FIGURE 36: SAMPLE LABELS



A. VTR Cassette and Cassette Box Label

B. Spine Label for VTR Cassette Box and Cassette

EQUIPMENT LIMITATIONS

The experimental nature of the project did not permit the acquisition of all the equipment needed to produce a "broadcast quality" signal. Notable equipment limitations which would be corrected for an operating system are listed below.

Telecine

The original planning did not include the ability to incorporate slides and films directly into the programming. Because the time required to record information from an optical medium, either film or slide, onto video tape is too long, time, cost and efficiency demand the inclusion of a telecine chain. Experience showed that in order to transfer film or slides to video tape the required lead time was a minimum of two weeks. The availability of equipment, be it on the telecine system in the Broadcast Communications Department at BCIT, or the system at PEMC also located on the BCIT campus, proved to be no easy solution to the problem because the owners of these facilities usually had them booked from eight in the morning until midnight.

Character Generator

During the project the system was incapable of preparing visually descriptive material or of identifying lecturers and members of teleconferences, therefore a character generator would have been of great assistance.

Time Base Corrector

There should be a time base corrector in the system for every video tape machine used because stabilization of video tape playback is the broadcast standard. Many of the video tapes that were played back on the system had recorded tracking errors on them and the only way to correct and stabilize playback of helical scan video tape is through the use of a digital time base corrector.

Lighting

The colour cameras that were being used in the system were the most economical that could be located. However, the light level that the cameras needed to produce a good picture is anywhere from two to three times the amount of light supplied by the fluorescent lighting in classrooms A and B. Fluorescent lighting was retained to provide as normal a lighting environment for the classes as was possible. To overcome the relatively low light levels from the existing fluorescent fixtures, additional fluorescent strips were added in both classrooms. The result of overall flat fluorescent lighting was not successful, as the cameras still had extreme lag and smear problems in the pictures.

Cameras

Even with quartz-iodine illumination at uncomfortably bright levels, the cameras do not produce an image capable of producing several generations as is required for editing. Replacement with more sensitive cameras will be required in a permanent operation. Also, remote pan-tilt-zoom should be installed on two of the three forward-facing cameras.

Air-Conditioning

The two classrooms have low ceilings and the air ducting systems going into both rooms do not have air-conditioning installed. If the rooms are to be permanently allocated to IITV, the installation of air-conditioning facilities to both rooms is required. During the project, air exchange and air cooling within the rooms was increased by leaving the doors open and using several portable fans. If broadcast standard television lighting were employed in classrooms A and B without the installation of proper air-conditioning it would not be comfortable to work in either room and on very sunny days the temperature would probably be intolerable.

Accommodation

The size of the classrooms used did not permit comfortable seating arrangements for sets of more than 24 students. If IITV becomes permanent, the facilities should be relocated to an area where the classroom size would permit greater spacing among students and would allow occasional increase of class size to 40.

Equipment Problems

There have been few problems with the heart equipment in the IITV system. The audio boards, video switchers, video sync generators, and video processing equipment functioned without failure during the project. The colour cameras required reregistration every three months. The major breakdown was with the lavalier microphone cords. These were frequent because people tend to stand on them or catch them underneath chairs. The wireless microphones proved to be less subject to failure and become the first choice of the instructor. The video tape machines only required the occasional tracking readjustment and daily cleaning of their video heads.

The satellite equipment itself suffered loss of transmission from the TVT location at BCIT on only two occasions and each time the loss was 30 minutes. The failure originated in the earth stations rather than in the satellite.

Appendix 1

Equipment Installed For The Original System

APPENDIX - 1

NO.	ITEMS	QUANTITY
1.	JVC camera model CH 1800 U	6
2.	Manually automatic adjustable lens 6/1 ratio	6
3.	Remote syncronizing unit JVC: model RS 1800 U	6
4.	Camera cable 49 ft. JVC: model VC 521U	12
5.	Camera wall mount c/w adjustable pan/tilt 25 lb. capacity loading: model NW 50	4
6.	Colour monitor/receiver 20" Electrohome educator: model 20RM	12
	NOTE: All units to be supplied with parts, service and instructional manuals.	
7.	Conrac colour monitor: model 5222 C19	1
8.	Telemation video switcher: model TVS 525	3
9.	Telemation frame: model RF 525	3
10.	Telemation power supply: model PS 525	3
11.	Telemation control panel: model for 525 system	3
12.	Telemation cable, 25 ft.: model CC5/25	3
13.	Telemation extender card: model EX 526	1
14.	Telemation hum elimination coil: model THE - 100	1
15.	Leitch extenders: model 100 ME	2
16.	Leitch frame: model V.S.I. 500	2
17.	Leitch identification unit: model 500 I.T. Timer	2
18.	Leitch identification unit: model 500 I.M. Matrix	2
19.	Leitch frame: model FR 601	1
20.	Leitch amplifier: model VCA 600	1

NO.	ITEMS	QUANTITY
21.	Leitch amplifier: model VEA 600	2
22.	Leitch sync generator: model CTG 200 N	2
23.	Modification to CTG 200 N as per technical specifications	2
24.	Leitch frame: model FR 600	2
25.	Leitch power supply: model PS 600	4
26.	Leitch amplifier: model PDA 600	6
27.	Leitch amplifier: model VDA 600	2
28.	Leitch amplifier: model VDA 601	6
29.	Leitch processing amplifier: model VPA 300 N	2
30.	Tektronix waveform monitor: model 528 option I	1
31.	Tektronix NTSC vectorscope: model 1420 option I	1
32.	Tektronix rack adapter: model 016-0115-02	1
33.	JVC viewfinder: model #VF-1800 U 5" complete with: - VAI for full black level and white balance adjustment - video select switch R, G, B, - G, auxiliary video monitor switch - 20' cable and connectors for JVC 1800 U camera	1
34.	List of equipment for audio system - Anik-B satellite pilot project:	
	- Lavalier microphone AKG D-110	4
	- Audio mixer Altec 1592B	2
	- Audio pre-amp Altec 1588	5
	- Limiter Altec 1612A	1
	- Audio monitor LSA 609	1
	- Head-set	1
	- Audio switcher Telemation TAS525	1
	- Audio distribution amp Telemation TAA525	4
	- Audio amp Telemation TAA524	1
	- Audio decoder speed call C527	2
	- Audio decoder relay speed call C535	2
	- Audio decoder P.S. speed call 518	2
	- Audio decoder shelf speed call 519	2
	- 24V power supply power-one P24	2

NO.	ITEMS	QUANTITY
35.	Colour video cassette recorder complete with rotary head helical scan recording system, NTSC colour video signal system. Tape speed 3 3/4 IPS, dust cover, power cord and 120 VAC 60 Hz power requirement: JVC CR 6060U	2
36.	Quadruple monochrome rack-mount monitors complete with 19" rack, 4-4" screens, horizontal resolution of 280 lines at centre and 120 VAC 50/60 Hz power requirement: Sony model PVM-400	2
37.	Remote control panel complete with single or simultaneous control and five momentary contact buttons with lamps: Telemation #RC-5	2
38.	Interconnecting cable for use with above control panel, 75 ft. long with connectors: Telemation #CC-5/75	2
39.	Cabinet racks: Hammond model 1463-E2 complete with 19" panel mounting with louvered rear door with lock. Overall dimensions 22½"W x 24"D x 84"H, colour ASA 61 baked enamel grey	3
40.	Trompeter video jacks: model #J3W	27
41.	24" Trompeter video patch cord: model #PCW 24-75	18
	NOTE: Items #40 and #41 must be identical to existing Trompeter video patch panel equipment to guarantee compatibility	
42.	Video camera mounts: Davis Sanford NW50	2
43.	Rack mounting kit for Telemation switcher panels: RP203	1
44.	75 ohm terminations for video: BNC connector type BTM	40
45.	Television monitor: Electrohome #ESM 914, 9" black/white	2
46.	Dynair VS12-L illuminated mechanical video switcher 12 input x 1 output complete with terminations	1
47.	Leitch video distribution amplifier: #VDA 601	1
48.	Leitch pulse distribution amplifier: #PDA 600	1

NO.	ITEMS	QUANTITY
49.	Fujinon TV zoom lens: model C5XZOMD-3B; focal length and zoom ratio 1:1.8/20-100	1
50.	Drape: 25'L x 9'H Track: Kirsh I beam with two 90° soft bends	1 ea.
51.	WT-02 pre-amplifier WME wireless microphone WTA wireless tuner unit 5356 transformer cable and connectors for above	1 2 2 1
52.	Hammond model 21-F bulk eraser, suitable for erasing 3/4" video cassettes, complete with foot switch	1

Appendix 2

Agencies And Individuals Responsible For The Setting Up And The Operation Of The Project

AGENCIES AND INDIVIDUALS RESPONSIBLE
FOR THE SETTING UP AND THE OPERATION OF
ANIK B
INTERACTIVE INSTRUCTIONAL TELEVISION PROJECT

Contracting Agencies

Canada Department of Communication
British Columbia Ministry of Education, Science and Technology

Operating Agency

British Columbia Institute of Technology
Department of Distance Education
Continuing Education and
Industry Services Division

Television Originating Centre

British Columbia Institute of Technology
Burnaby, B.C.

Receiving Sites

A. Satellite Audio Return

- Port Alberni
- Terrace
- Prince George
- Cranbrook
- Whitehorse
- Dawson Creek

B. Land-line Audio Return

- Gold River
- Prince Rupert
- Mackenzie
- Fort St. John
- Fort Nelson

Participants

A. Originating

- Ministry of Education, Science and Technology
- British Columbia Institute of Technology
- Ministry of Communications, Transport and Highways
- Ministry of Labour, Building Standards Branch
- Ministry of Provincial Secretary, Recreation Branch
- University of Victoria
- North Island College
- University of British Columbia
- Alberta Educational Communications Corporation

B. Receiving Institutions

- North Island College
- Northwest Community College
- College of New Caledonia
- Northern Lights College
- East Kootenay Community College
- Yukon Vocational and Technical Training Centre

In addition the signal is being received in Alberta at

- Medicine Hat
- Edmonton
- Grand Prairie
- Fort McMurray
- High Level
- Grouard
- Peace River

Personnel Responsible

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

- Dr. Walter Hardwick, Deputy Minister
- David Roach, Executive Administrator

FEDERAL DEPARTMENT OF COMMUNICATIONS

- John Thwaites, Social Economic Advisor, Pacific Region Office, Vancouver
- Terry Kerr, Anik-B Project Manager
- Doris Jelly, Assistant Anik-B Project Manager
- John Day, Manager, Communications Systems Engineer
- Ken Gustafson, Project Co-ordinator
- Ron O'Connor, Project Co-ordinator
- Bill McConnell, Station Manager

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

- David Brousson, Dean, Continuing Education and Industry Services
- Bill Robertson, Head, Distance Education Department
- Rob Nason, Technical and Facilities Co-ordinator
- David Billman, Technical Producer
- Deanna Giles, Technical Producer
- Derek Knox, Programme Developer
- Joan Cooper, Co-ordinator, Directed Study Centre

NORTH ISLAND COLLEGE

John W. Tayless, Director of Academic Programmes

Port Alberni
- Joan Frohn-Nielsen, Centre Administrator
- George Knox, Technical Co-ordinator, ANIK-B

Gold River
- Dr. David N. Hudson, Centre Director and Co-ordinator, ANIK-B

NORTHWEST COLLEGE

Terrace
- Gary Karlsen, Co-ordinator of Distance Education and ANIK-B
- Tom Knox, Assistant Co-ordinator (part-time) ANIK-B

Prince Rupert
- Laurie Jones, Programme Developer & Co-ordinator, ANIK-B

COLLEGE OF NEW CALEDONIA

Prince George
- Charles McCaffray, Principal
- Dave Snider, Liaison Officer
- Stewart Berry, Head Audio Visual Dept. and Technical Co-ordinator, ANIK-B

Mackenzie
- M. Nancy Jennings, Regional Director and Co-ordinator, ANIK-B

EAST KOOTENAY COMMUNITY COLLEGE

Cranbrook - Dr. Larry Szalanski, Dean, Academic Technical
April 1979 - March 1980 - Joe Selby, Co-ordinator Business Administration and Co-ordinator, ANIK-B
- Barry Brooks, Computer Manager and Technical Co-ordinator, ANIK-B

March 1980 - May 1980 - Dale Fike, Dean, Adult Education
- Kathryn Teneese, Adult Education Co-ordinator
- Judy Becker, Programme Co-ordinator, ANIK-B

NORTHERN LIGHTS COLLEGE

Dawson Creek - C.A. (Al) Westcott, Dean of Instruction and Programme Co-ordinator, ANIK-B

Fort St. John - Margaret J. Cleaveley, Principal and Co-ordinator, ANIK-B

Fort Nelson - A.V. Walker, Principal, Administrator and Co-ordinator, ANIK-B

YUKON VOCATIONAL AND TECHNICAL TRAINING CENTRE

Whitehorse - Steve Schaffer, Vice-Principal and Administrator
- Muriel J. McRae, Co-ordinator for ANIK-B

Appendix 3

Course Selection Process And Its Results

COURSE SELECTION PROCESS AND ITS RESULTS

ANIK-B

INTERACTIVE INSTRUCTIONAL TELEVISION PROJECT

Course Selection

It was decided that the courses offered were not only to be of high quality but that they should be of special interest to people in the college regions. They were also to be courses normally available only to those students attending BCIT. The courses were designated either for credit or for professional upgrading.

In April, 1979, a programme committee, consisting of representatives from each of the Engineering, Business, Health and Continuing Education Divisions of BCIT, were asked to select a number of courses from their respective areas and to submit a list of the selected courses with brief course descriptions.

Instructors were told that regular courses were to be taught in a regular way over a full instructional year in order to test the system in a traditional classroom setting.

The programme committee came back with a list of sixty-three courses. The list was sent to the colleges with an invitation to select the six courses they would like to see given priority.

The following list was drawn from the responses:

Day Courses	Night Courses
Business Math	Refresher Modules for Graduate Nurses
Mining	Supervisory Skills
Forest Utilization	Construction Administration

This list was sent back to the colleges for approval. Business Math and Supervisory Skills were dropped because of lack of interest by a majority of the colleges.

The Project Co-ordinator[1] from BCIT selected two additional courses, Hospitality and Tourism and Reading and Study Skills. These were subsequently approved.

The University of Victoria and the Department of Highways were approached to fill in the other openings in the transmission time.

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[1] Mr. W.D. Robertson, Head, Distance Education

The final list of courses offered in the first term was as follows:

Concrete Technology
Construction Administration
Forest Utilization
Geology and Soils
Careers in the Hospitality and Tourism Industry
Mining
Refresher Modules for Graduate Nurses
Reading and Study Skills
Technical Surveying 1 - Metric
Supervisory Skills for Educators ED-B 435

In the second term, some of the first term courses were dropped and others were included. The following shows a complete list of all events aired during the project.

1. Courses

Anatomy and Physiology Review
Careers in the Hospitality and Tourism Industry: 18.902
Concrete Technology
Construction Administration: 40.954
Estates for Legal Assistants and Legal Secretaries: 8033SA
Evaluation (Instructor's Diploma Program): ID104
Foreclosure Actions: 7962SA
Forest Utilization: 46.101
Geology and Soils 1
Mining: 50.102/202
National Building Code: 40.915
Psychology 111 - Child Development 1 - The Growing Years
Reading and Study Skills: 31.905
Recent Developments in B.C. Law
Refresher Modules for Graduate Nurses: 76.916

Supervision of Instruction: ED-B 435
Teaching Reading in the Primary Grades: ED-B 480
Technical Surveying 1 - Metric

2. Seminars

Alcoholism: Current Concepts and Treatment
Avalanche Information for the Winter Recreationist
Community Schools
Family Law - "After the Honeymoon"
Forestry Law: 7961 SA
Genetics in Medicine
History and Current Events
Management of Forest, Range, and Recreation Resources
Management of Recreation Facilities
News Media Forum
Playground Leadership and Pre-school Recreation
Professional Responsibility in Real Property Transactions: 8034 SA
Public Administration
Real Estate Series
Special Programmes for Builders
UBC Continuing Pharmacy Education

3. Specials

BCIT Broadcast Department
Opening of Satellite Network
UBC Health Sciences Open House

4. Teleconferences

Anatomy and Physiology
Association of B.C. Professional Foresters (A.B.C.P.F.)
Association of Canadian Community Colleges Conference
Association of Student Awards Personnel of B.C.

Audio Visual Communication Association
British Columbia Institute of Technology Counselling Department
British Columbia Association of Continuing Education Administrators
Broadcast Educators Association of Canada
Building Inspectors Annual General Meeting
Building Standards Branch
Council of Principals
Forest Fire Management
Genetics in Medicine
IITV Coordinator's Planning Conference
Industry Services
Librarians
North Island College
Open Learning Institute Exploration
Programme Planning
Project Evaluation Review
Recreation Seminars
Resource Tech
The Continuing Legal Education Society of B.C.
Weekly IITV Users Administration Teleconference
Test of Facsimile Equipment

5. Alberta ACCESS Programmes

Adventures in History
Athabasca University
Basic Horse Care
Basic Photography
Car Owners Maintenance Guide
Classics Dark and Dangerous
Coping with Stress
Episodes and Issues in Canadian History
Explorations in the Novel
Family and the Law
Finding My Own Way
Focus on Childhood

In the Shadow of the Giant
Library Course - Technical Processing
No Time to Lose
Olympic Profiles
Planet of Man
Renewable Society
The Age of Uncertainty
The Ascent of Man
World in Your Kitchen

"END OF DOCUMENT".